Manitoba
Agriculture

# 1990

# Guide to Chemical Weed Control

**THIS PUBLICATION IS ONLY A GUIDE. ALWAYS REFER TO THE PRODUCT LABEL TO CHECK RATES AND ADDITIONAL PRECAUTIONS.**

Cereal Crops
Special Crops
Forage Crops
Horticultural Crops
Non-Crop
Special Weeds
Information

## *Cover Photos*

### NIGHT-FLOWERING CATCHFLY

*(Silene noctiflora)*

**DISTRIBUTION:** Night-flowering catchfly is found throughout the main agricultural region of southern Manitoba and infests one in five cropped fields. It prefers light-textured soils (i.e. sandy or sandy loams), but is also found on heavier soils which are well-drained. Particularly heavy concentrations of the weed have been documented in the Interlake, the Parklands area and on the Escarpment of the southwestern portion of the province.

**LIFE CYCLE:** Night-flowering catchfly usually grows as an annual, germinating in the spring from seed and completing its life cycle by fall. But in fields not cultivated in fall, the weed may behave as a winter annual germinating in late August, overwintering as a rosette and producing seed in mid-summer.

**DESCRIPTION:** Night-flowering catchfly can be recognized by the following features: (1) paired, spoon-shaped leaves which are slightly hairy, (2) a vase-shaped capsule found behind the petals of white or rose-colored flowers, (3) flowers which open only at dusk, (4) presence of a sticky sap or secretion on the top half of the plant at flowering time. Similar looking plants (i.e. white cockle, bladder campion, cow cockle) will be missing one or more of these key characteristics.

**ECONOMIC IMPACT:** The weed will compete for moisture, nutrients and light in all crops, usually less aggressively in competitive cereals or oilseeds (such as barley or canola) than in crops which are weak competitors (such as lentils). It is of serious concern in alfalfa seed fields because it produces a seed which is about the same size as alfalfa seed and, therefore, is difficult to clean out.

**CONTROL:** Prevent introduction of this weed into fields by sowing seed which does not contain night-flowering catchfly seed. Since catchfly seed may legally be present in small numbers even in pedigreed seed, request a seed analysis to ensure that the weed is not being imported onto your farm.

On fields which are currently infested with night-flowering catchfly, grow a well-fertilized, competitive crop. Avoid sowing alfalfa or clover for seed in fields with heavy populations of this weed.

Use herbicides which are recommended for control of night-flowering catchfly. Wherever possible, choose products which are rated 'Good' on night-flowering catchfly in the crop tables found in this publication. Note that several crops do not have any herbicide recommendations for catchfly control (eg. lentils, mustard, sunflowers).

**LEGISLATION:** Night-flowering catchfly is listed as a noxious weed under Manitoba's Noxious Weeds Act.

*Cover photographs courtesy of Dr. I.N. Morrison, University of Manitoba, and Manitoba Agriculture.*

90-05055/

# 1990 Guide to Chemical Weed Control

Prepared by

Manitoba Agriculture in co-operation
with Weed Research Personnel in Industry,
the University of Manitoba and Agriculture Canada.

The *Guide to Chemical Weed Control* includes the most recent herbicide recommendations for weed control in Manitoba. These recommendations are based on the uses registered under Agriculture Canada's Pest Control Products Act which apply to Manitoba conditions. It is an offence under the federal Pest Control Products Act to apply any herbicide in a manner not consistent with the product label. If you have doubt regarding the instructions in this bulletin or on the product label contact the company representative or Manitoba Agriculture for further advice.

Remember that a sound weed control program consists of more than just herbicide application. Herbicide recommendations must be combined with appropriate crop selection, good cultural practices and use of other weed control methods. Additional information on cultural, mechanical and biological control methods can be obtained from your provincial agricultural representative, weed specialist or crop specialist; your local weed supervisor; the Plant Science Department at the University of Manitoba; and Agriculture Canada Research Stations at Brandon and Morden.

Any use of herbicides not recommended in this publication must have the approval of the Environmental Control Branch of the Department of Environment.

Government Departments, Crown Corporations, municipal corporations or any agent acting on their behalf should contact the Environmental Control Branch of the Department of Environment and obtain the required pesticide use permits before applying any herbicides.

In the use of herbicides, responsibility rests on the user to prevent spray drift onto susceptible crops or damage to crops from improper use. The user must also ensure that containers are properly rinsed and delivered to designated pesticide container disposal sites. All personnel handling or applying herbicides should use protective clothing to minimize exposure. Additional detail on safe handling, use of protective equipment and container disposal is included in this Guide.

**REFER TO THE 1990 ADDENDUM TO THE GUIDE TO CHEMICAL WEED CONTROL FOR PRODUCTS WITH NEW OR TEMPORARY REGISTRATIONS (AVAILABLE APRIL 1990).**

**READ AND FOLLOW LABEL INSTRUCTIONS.**

**PRACTISE SAFETY IN USING HERBICIDES.**

**TRIPLE RINSE OR PRESSURE RINSE CONTAINERS AND DELIVER TO A DESIGNATED PESTICIDE CONTAINER DISPOSAL SITE.**

**EMERGENCY NUMBERS**

| | |
|---|---|
| **POISON CONTROL CENTRE** | **1-787-2591** |
| **PESTICIDE SPILLS** | **1-944-4888** |

**This publication is intended to be used as a guide only. Information contained herein is that available at time of printing. While every effort has been made to ensure accuracy, Manitoba Agriculture does not accept responsibility for label changes, errors in conversion or otherwise. Consult product labels, attached to pesticide containers, for final detailed instructions.**

**All recommendations in this publication are given in quantity of commercial product per acre (L or kg/acre). Product labels are given in quantity of product per hectare (L or kg/ha). To avoid application errors be sure to read and understand label recommendations.**

# Using The Guide

The *Guide to Chemical Weed Control* contains information on use of registered herbicides applicable in Manitoba. The rates and methods of application are based on research and field experience. While this guide summarizes information on individual herbicides, **it is essential that product labels be read for detailed instructions, restrictions and precautions.**

For effective weed control you must:

**A. Identify your weed problem.** Use the Manitoba Agriculture publication 'Weed Seedling Identification' to help identify weeds on your farm, or take samples to your Ag Rep or Weed Supervisor.

**B. Turn to the appropriate crop section in this guide and use the summary chart to match your weed problems with the herbicides available for use in that crop.** Weeds not listed in the individual crop summary charts are included in the large tables folded inside the back cover. Crop tolerance and weed control ratings for herbicides are included in several of the summary tables. These ratings are based on field experience and provide a general indication of the consistency of individual treatments when applied as recommended. Effectiveness of the treatment in any given year will depend on growing conditions and application methods; it may be either better or worse than the averages indicated in the tables.

**C. Consider all possible alternatives and select the most suitable recommendation.** For most crops the recommendations use a standard format to facilitate comparisons, and include the following information:

- PRODUCT TRADE NAMES AND FORMULATION CONCENTRATION
  - refer to Table 26 at the back of the guide for a listing of active ingredients and manufacturers.
- APPLICATION TIMING
  - refer to Figures 5, 6 and 7 to confirm that crop and weeds are in the correct stages for application.
- RATES
  - as a service to farmers, recommended rates in this Guide are given in terms of **product (L or kg) per ACRE.** Note that product labels provide rates in metric units (L or kg per hectare) and in some instances imperial equivalents (gal or lb per acre). To avoid application errors be sure to read and understand label directions. Be sure that the concentration of the product you are using matches the concentration shown in this guide. You can check product rates by multiplying the rate given on the product label by 0.4047 to obtain the rate as listed in this Guide, or refer to the conversion chart inside the back cover. **If you are unsure about the correct amount of product to use, don't take a chance! Contact your local Ag Rep, Weed Supervisor or chemical company representative for clarification.**
- APPLICATION
  - Unless otherwise noted, all recommendations are based on application using a standard field sprayer. Refer to the Manitoba Agriculture publication 'Field Sprayers' for information on sprayer calibration and adjustments. It also has specific information on nozzle types, pressures, heights, sprayer components, operation and cleaning.
  - Granular products should be applied using a suitable granular applicator carefully calibrated and adjusted to ensure even product distribution.
  - Recommendations for aerial application are provided in a separate section (Table 19).
- WATER VOLUME
  - The recommended water volume for optimum results is indicated. For most herbicides, a water volume of 45 L/acre (10 gal/acre) is recommended, but certain herbicides must be applied at other water volumes to improve crop safety and/or increase effectiveness. Use of water volumes other than those recommended may lead to crop injury and/or poor weed control.
- PRESSURE
  - The recommended pressure provides a suitable distribution of spray droplets while minimizing off-target drift.
- NOZZLES
  - Recommended nozzle types are indicated. Use of nozzle types other than those recommended can result in reduced weed control. Nozzle screens and filters should be 100 mesh unless otherwise indicated.
- INCORPORATION
  - A brief description of incorporation requirements for soil applied products is included. For additional information on suitable implements, operating speeds, and depth of incorporation refer to the *Herbicide Information* section near the back of this book.
- TANK MIXES
  - Recommended tank mixtures with other herbicides, fertilizers, and insecticides are listed. The order in which the products are added to the spray tank may be critical in avoiding physical incompatibilities; **always check the product label for specific mixing instructions.**
  - Use of tank mixes which are not recommended can lead to reduced weed control, crop injury, or to plugging of filters and nozzles. The required time interval between sequential applications of herbicides necessary to achieve satisfactory results from both products is noted.
- RESTRICTIONS
  - To ensure that unacceptable chemical residues do not contaminate harvested crops, the required interval between application and crop harvest is noted. Where no preharvest interval is specified, it is important to apply only at the recommended crop stage to avoid unacceptable residues at harvest.

- The required interval between application and rainfall to avoid reduced effectiveness is noted. Rainfall intervals for all products are listed in Table 23.
- To avoid unacceptable chemical residues in meat and milk, the required interval between spraying and grazing or cutting for livestock feed is listed. Table 22 compares livestock grazing and feeding restrictions for all products.
- Winter storage conditions for unused product are provided. A summary of storage requirements for all products is included in Table 25.
- Recropping restrictions are listed to ensure that crops planted following herbicide application (either the same year or in subsequent years) are not injured by herbicide residues in the soil. Further detail on crops which may be affected the year following use of the herbicide is included in Table 24.

- ENVIRONMENTAL PRECAUTIONS
  - Information on the effect of weather and growing conditions on the performance of the herbicide is summarized. Additional detail may be provided on the product label.
- COMMENTS
  - This section notes specific conditions or product limitations which most frequently lead to poor results under Manitoba conditions. The product label will provide additional detail on application methods and conditions necessary for satisfactory results.

**D. Record application information for each field by maintaining application records.** Application records are useful in avoiding crop injury problems from residual herbicides, for checking to ensure that the same herbicide is not used repeatedly on any one field, and for evaluating application methods and herbicide performance under various environmental conditions. Forms for this purpose are provided at the back of the Guide. Additional herbicide application record forms are available from your local Ag Rep or Weed Supervisor.

**E. Be sure to walk your fields and evaluate the results obtained from your herbicide program.** By keeping notes on herbicide performance, adjustments can be made next season to ensure that your weed control efforts keep pace with changes in weed populations on your farm.

# NOTES

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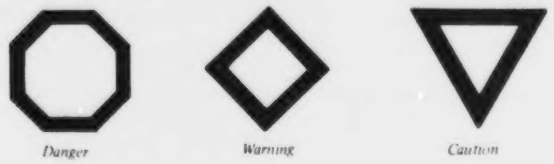
# Introduction

## *Practise Safety in Using Herbicides*

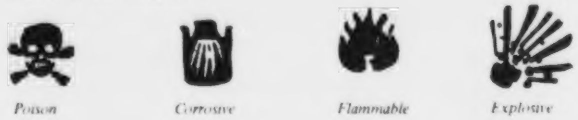
Herbicides are classified according to the use hazard and risk involved. The categories of hazard are toxicity, flammability, explosive potential and corrosivity. The degree of risk is represented by symbols taken from common traffic sign shapes represented by the stop, caution and yield signs. The signal word for each of the signs is danger, warning and caution. Where the risk is minimal, no designation is required. The label on the herbicide container will carry the appropriate signs for the protection of the user. Degree of risk symbols for herbicides used in field and forage crops are included on the Field Crops Chart and Forage Crops Chart inside the back cover of this Guide. The symbols are illustrated below:

FIGURE 1. Risk and Hazard Symbols

Degree of Risk Symbols



Category of Hazard Symbols



Know and observe the following guidelines:

1. Never smoke while applying herbicides.
2. Avoid inhaling sprays or dusts. Wear protective clothing and a respirator. Additional detail on personal protective equipment is provided below.
3. Sprayer lines carrying herbicide must not enter the operator's cab.
4. Have soap, water and a towel available. Should concentrated product spill on skin, hands, face or eyes, wash immediately.
5. Wash hands and face when leaving the treated area, before break periods, lunch, or for comfort.
6. Bath or shower and change to clean clothing after working with herbicides. Wash clothing each day before re-use.
7. Call a physician or get the patient to a hospital immediately if symptoms of illness occur during or shortly after herbicide application. Be sure to take along the product label or container.
8. Store herbicides out of the reach of children.
9. Store herbicides where there is no chance of contact with human food or livestock feeds. Do not store herbicides with insecticides, and avoid cross-contamination. Storage areas should be locked.
10. Keep chemicals in their original containers, never in unmarked containers or bottles used for food or drink.
11. Never fill spray tanks directly from a potable water source such as a well or dugout.
12. Follow proper container disposal methods. All containers should be triple rinsed or pressure rinsed, punctured to render the container nonreusable, and delivered to designated disposal sites.

## *Protective Equipment for Herbicide Users*

The use of protective equipment is an integral but often neglected facet of safety in the handling and application of pesticides, including herbicides. The wearing of a respirator, proper eye shields (goggles), gloves, foot wear, and other protective clothing is recommended.

### Chemical Cartridge Respirator

Dust masks are ineffective in protecting against herbicide vapours. Similarly, the filters on tractor cabs are intended to remove dust and are not designed to protect against herbicide vapours or mists. Chemical cartridge respirators are recommended for outdoor use when mixing and applying herbicides.

Only NIOSH approved respirators should be used. Do not interchange component parts of respirators. For example, do not use a cartridge produced by company "A" with a respirator produced by company "B" as the combination may not provide adequate protection to the user.

When carrying out spray operations, filters should be changed each day, and the cartridges should be replaced when chemical odour becomes apparent or when breathing becomes difficult. New cartridges should always be installed at the start of the spraying season. Prior to commencing work, the face seal should be checked while the respirator is on the wearer's face. Regardless of design, respirators cannot be worn securely by people wearing beards, moustaches or sideburns.

Contact any of the supply companies listed below or the Department of Labour and Workplace Safety and Health for information on respiratory protection against specific herbicides.

### Eye Protection

The use of protective goggles is necessary and recommended when a full face mask is not worn.

Many goggles are chemical resistant. Some have specifically treated lenses to reduce fogging. Others have anti-fogging ventilation. Prescription type safety spectacles are also available to which side shields can be attached, when necessary.

### Gloves

Non-absorbent gloves should be worn at all times while handling, mixing and applying herbicides. Neoprene has been found superior to rubber in resisting the absorptive penetration of many substances associated with herbicides.

Other factors to be considered in selecting suitable gloves include sense of touch, wet grip, cut resistance, and abrasion resistance. Gloves should fit snugly. Fabric wrist gloves should not be considered.

### Footwear

Non-absorbent footwear should be worn when applying herbicides. The most suitable boot is one that is knee length, acid and solvent resistant, and cleated or ribbed to prevent slippage. Neoprene is considered superior to rubber in withstanding various acids and solvents.

### Other Clothing

A major concern in agricultural herbicide spraying is the unwillingness of the applicator to wear some form of protective clothing, particularly under warm summer conditions. At the very least, coveralls should be worn along with gloves and a hat to minimize the hazard of dermally toxic (absorbed through skin) herbicides. The clothing should be changed and washed regularly following spraying.

Disposable garments suitable for herbicide work are now available. Made of "Tyvek" polyethylene fibres, such clothing will provide protection against dermal exposure resulting from pesticide drift, splashing, or spills. Light-weight and economical, disposable garments are available as coveralls, shirts and pants, headcovers, and aprons.

Supplies of goggles, prescription type safety spectacles, neoprene gloves, boots and other protective clothing including hats are available from any one of the major safety supply companies listed below.

### Availability

Many pesticide dealers stock personal protective equipment for herbicide users. In addition, several Manitoba safety supply companies provide a wide range of products. Some firms offer complete lines, others specialize. The following companies can meet the needs of herbicide users:

– IPACO Safety Products – 775-8208

– Levitt - Safety Limited – 633-7228

– MSA Canada Incorporated – 632-7570

– Safety Centre Limited – 772-2495

– Safety Supply Canada – 453-7838

Check the Telephone Directory Yellow Pages for addresses and branch locations.

**IN CASE OF ACCIDENT OR POISONING WITH ANY PESTICIDE, CONTACT YOUR LOCAL HOSPITAL. FOR FURTHER INFORMATION, CONTACT:**

**POISON CONTROL**
**HEALTH SCIENCES CENTRE**
**CHILDREN'S CENTRE**
**685 BANNATYNE AVENUE**
**WINNIPEG, MANITOBA, R3E 0W1**
**TELEPHONE: 1-787-2591**

## *Herbicide Container Disposal*

Rinse all containers prior to disposal to reduce environmental contamination caused by open dumping of unwanted herbicide containers.

### Triple Rinsing

Triple rinsing renders used pesticide containers (metal, plastic, glass) more than 99.9% free of residues in most cases.

Here are the steps that should be followed:

1. Empty contents of the container into the spray tank and drain in a vertical position for 30 seconds.
2. Add a measured amount of rinse water or other dilutent so container is about 1/5 full.
3. Rinse the container thoroughly and pour the rinsate into the spray tank.
4. Repeat the procedure three times; it should only take about 5 minutes in total.
5. Triple rinsed containers should be punctured or broken to render them non-reusable. Paper bags should be rinsed once prior to disposal.

### Pressure Rinsing

Pressure rinsers are available which have the versatility to rinse all sizes of empty pesticide containers that can be lifted into position over the spray tank.

A 30 second rinse with any of these pressure rinsers is convenient and just as effective as triple rinsing.

The pressure rinsers are all constructed to be thrust into the bottom of a metal can or plastic jug. Holes, situated laterally in the rinser tip, direct water from a pressurized source onto the inner sides of the container and effectively wash the residual pesticide into the spray tank.

Some farmers have found it convenient to attach a rinser to the pump on their large water storage tank to minimize container handling.

Pressure rinsers have the added advantage of rendering containers useless by automatically puncturing them.

### Disposal of Containers

Properly rinsed containers should be delivered to a designated pesticide container disposal site. Contact your Ag Rep or Weed Supervisor for the locations of pesticide container disposal sites in your municipality.

## pH of Cultivated Soils

### Soil pH

The pH scale, ranging from 0 to 14, is used to indicate the relative acidity or alkalinity of a soil solution. A soil with a pH of 7.0 is said to be neutral, while values less than 7.0 are acid; pH values greater than 7.0 are alkaline.

Soil pH values on the pH map (Figure 2) are from surface soils (0 to 6 inches (0 to 15 cm) depth). Most subsoils in Manitoba are more alkaline (have a higher pH) than surface soils.

### Data Source and Analysis

Approximately 5,000 pH values from soil survey data files and 90,000 pH values from soil test files were examined. Samples were grouped into areas of homogenous soil landscape areas using a generalized soil landscape map. Within each landscape area pH values were grouped into three classes:

A – pH less than 7.1

B – pH 7.1 to 7.5

C – pH greater than 7.5

The distribution of soil pH in each pH class was calculated for all map units.

### pH of Manitoba Soils

Most surface soils in the agricultural area of Manitoba are alkaline in reaction. Many of these alkaline soils have a pH greater than 7.5. Acid soils represent only a minor portion of the agricultural soils of Manitoba.

### pH Variability

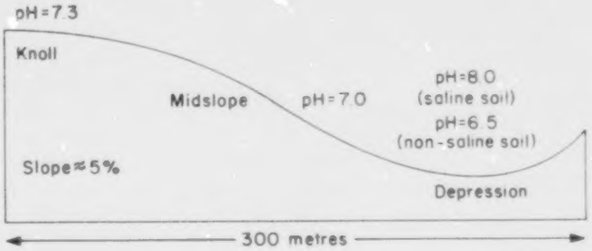
Soil pH will vary from field to field. Soil pH can also fluctuate during the year at a given location, by as much as 0.5 pH units. This variability is due mainly to temperature change, aeration, biological activity and salt concentration.

*(See FIGURE 2 on next page)*

### Variation of Soil pH Within a Field

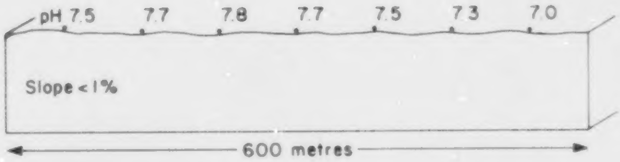
There can be variability in soil pH of up to one pH unit in both undulating and level areas within a field.

FIGURE 3. pH VARIABILITY ON AN UNDULATING LANDSCAPE



Soil pH values in a rolling landscape generally decrease from the knoll to the depression except for salt affected soils. Salt affected soils have higher pH values in depressional areas than on the mid or upper slope positions.

FIGURE 4. pH VARIABILITY ON A NEARLY LEVEL LANDSCAPE



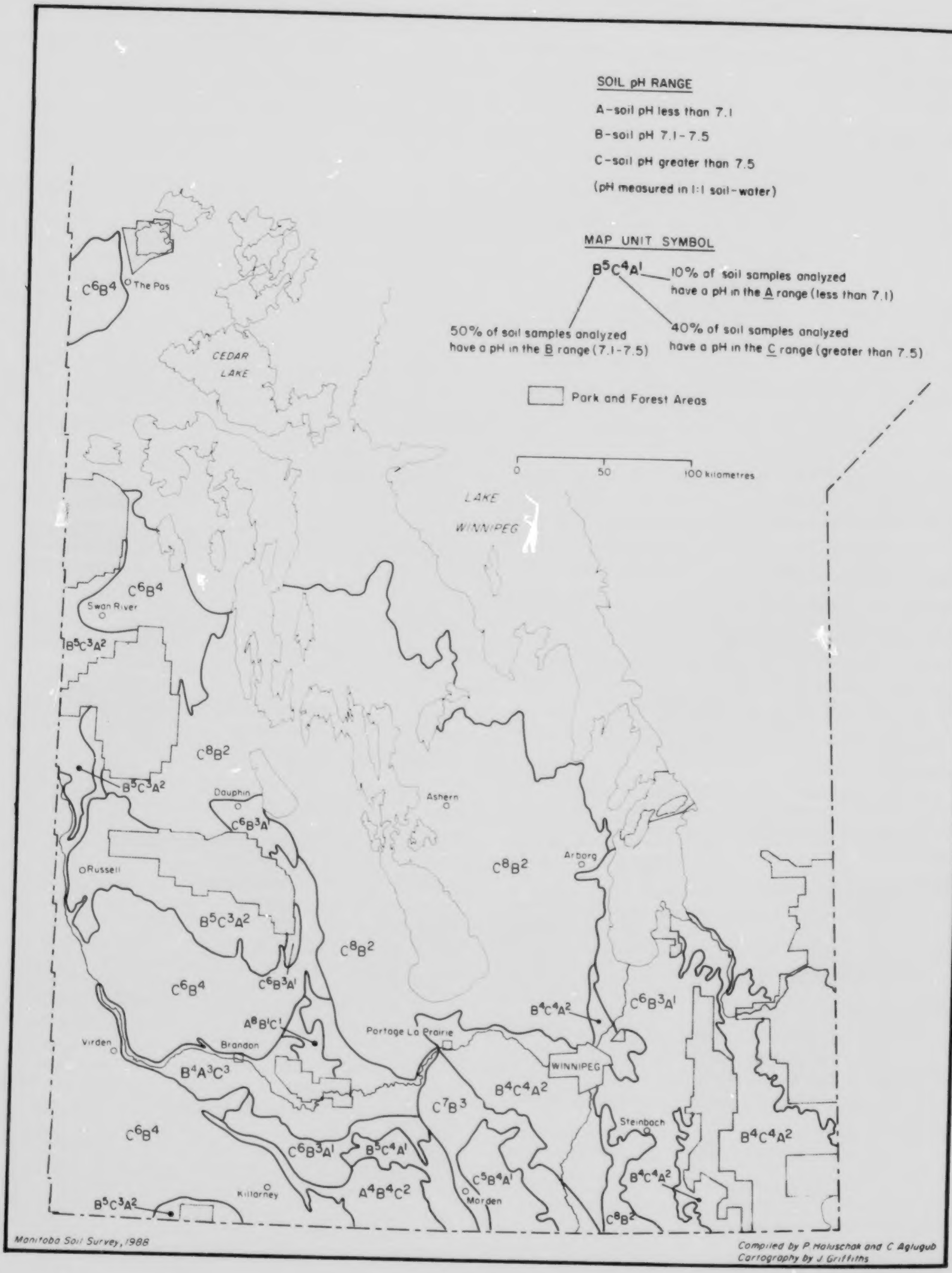
Even fields which are considered level may often have highly variable pH values (see diagram).

### Soil Sampling for pH

Soil pH values are often reported in soil test results. These values, however, represent the average pH of the fields tested and do not indicate the range of pH values which might occur in that field.

Soil sampling for pH must be done on an individual field basis. Samples from different fields should not be mixed. Begin by evaluating the field to determine representative areas and proceed to sample. Level fields will be relatively easy to sample, but on hilly fields with knolls, slopes or depressions, take samples in each area as though they were separate fields. Areas within fields having distinctly different soil properties such as texture, should also be sampled as separate fields because of differences in pH that will occur. Avoid sampling in abnormal areas such as old manure piles, corals, old fencerows or farmstead sites. At least 15 to 20 sampling sites are required for each field to provide a good representative sample. A minimum of one sampling site for every 2.5 to 4 acres should be considered. Samples taken from only four or five sites in a field are not representative and may result in incorrect average pH readings for the field. Correct sampling depth for soil pH is 0 to 6 inches (0 to 15 cm).

FIGURE 2. SOIL pH MAP OF MANITOBA


SOIL pH RANGE
A-soil pH less than 7.1
B-soil pH 7.1-7.5
C-soil pH greater than 7.5
(pH measured in 1:1 soil-water)
MAP UNIT SYMBOL
$B^5C^4A^1$
10% of soil samples analyzed have a pH in the A range (less than 7.1)
50% of soil samples analyzed have a pH in the B range (7.1-7.5)
40% of soil samples analyzed have a pH in the C range (greater than 7.5)
Park and Forest Areas
0
50
100 kilometres
CEDAR LAKE
LAKE WINNIPEG
The Pas
$C^6B^4$
Swan River
$C^6B^4$
$B^5C^3A^2$
$C^8B^2$
$B^5C^3A^2$
Dauphin
$C^6B^3A^1$
Ashern
Russell
Arborg
$C^8B^2$
$B^5C^3A^2$
$C^8B^2$
$C^6B^4$
$C^6B^3A^1$
$A^8B^1C^1$
$B^4C^4A^2$
$C^6B^3A^1$
Virden
Brandon
Portage La Prairie
WINNIPEG
$B^4A^3C^3$
$C^7B^3$
$B^4C^4A^2$
Steinbach
$C^6B^4$
$C^6B^3A^1$
$B^5C^4A^1$
$B^4C^4A^2$
$C^5B^4A^1$
$B^4C^4A^2$
Killarney
$A^4B^4C^2$
Morden
$B^5C^3A^2$
$C^8B^2$

Manitoba Soil Survey, 1988

Compiled by P. Haluschak and C. Aglugub
Cartography by J. Griffiths

Immediately after the samples have been taken:

- Mix the soil in each container thoroughly.
- Remove about 1 pint (0.5 litres) of soil and spread on a piece of clean paper.
- Completely dry at a temperature of not more than 30° C.
- Care should be taken to avoid contamination of the samples with foreign materials such as commercial fertilizer, manure, salt, baking soda, water, dust, etc. Samples should not be dried on old fertilizer or feed bags or in areas where fertilizers have been handled.
- A fan may be used to ensure constant air flow over samples and enhance drying. Once the sample is thoroughly dry, fill the soil sample cartons. Label each carton with the correct field number and sample depth. Complete an information sheet for each field. Forward samples along with payment to the Provincial Soil Testing Laboratory. Contact your Ag Rep for additional information on sampling, handling, and shipping of soil samples.

## *Resistance of Weeds to Herbicides*

It has long been known that the repeated use of any one herbicide on an individual field can result in an increase in weeds not controlled by that herbicide. For example, weeds such as wild buckwheat which are not controlled by 2,4-D or MCPA, increase in abundance in fields treated repeatedly with these herbicides. Similarly, green foxtail flourishes in fields treated with herbicides which control only wild oats.

In addition to this shift in weed species, repeated use of one herbicide on an individual field can lead to the selection of strains of a weed tolerant to the herbicide being used to control it. For example, repeated use of atrazine in corn production to control weeds such as red root pigweed and lamb's quarters has resulted in the development of strains of these weeds which are tolerant to high rates of atrazine and related herbicides such as Bladex. These triazine resistant strains look exactly like the susceptible strains, but they are not killed when treated. Triazine resistent pigweed and lamb's quarters are now abundant in corn growing areas of Ontario, Quebec and British Columbia.

Strains of weeds which are resistant to sulfonyl ureas (Glean, Ally, Refine) have developed in both the U.S. and Canada following repeated use of these herbicides on fields. Species which have developed resistant strains include Russian thistle, chickweed and kochia.

In Manitoba, repeated use of trifluralin products (Rival, Treflan, Triflurex) has led to the development of green foxtail populations tolerant to these herbicides. Strains of green foxtail which are resistant to trifluralin are also resistant to Edge.

It is far easier to avoid development of resistant weed strains than it is to eradicate or control them after they develop and infest an area. To avoid the development of resistance on your farm it is essential to **rotate your herbicides.** Rather than using the same herbicide year after year, use different herbicides in different years. For example, rather than relying on the same wild oat herbicide every year, consider using other available products on a regular basis. **Crop rotations** which allow a wider range of herbicides to be used are helpful in preventing the buildup of resistant weed populations. However, crop rotations which utilize the same herbicide can accelerate the development of herbicide resistant weeds. For example, use of trifluralin in both cereal and oilseed crops for control of green foxtail will encourage development of trifluralin-tolerant foxtail, so trifluralin use should be rotated with the use of other herbicides. Additional information on the development of herbicide resistance in weed populations is available from your ag rep or weed supervisor.

## *Field Sprayer Recommendations*

- Do not use air blast or air mist sprayers to apply herbicides.
- Do not spray in winds above 20 km/h (12 mph.)
- Avoid using nozzle pressures above 45 psi (300 kPa).
- Use a minimum of 45 L/acre water for all herbicides unless otherwise specified for the product.
- Do not spray when the wind is blowing towards a nearby sensitive crop, shelterbelt or garden.
- Avoid spraying in a dead calm near sensitive plants.
- Do not use end nozzles for field spraying. Use them only for areas inaccessible to the spray boom, and only when winds are very light.
- Select nozzles that will produce uniform patterns, correct application rates and low drift hazards. For most conditions, 80° flat fan nozzles produce a better combination of pattern uniformity and drift control than do flooding nozzles, 65° or 73° flat fan nozzles, or cone nozzles.
- Refer to the Manitoba Agriculture publication 'Field Sprayers' and the fact sheet 'Calibration and Metric Conversions for Farm Sprayers' for additional information on spraying equipment and calibration.

### Calculating Product Requirements

Label rates on herbicide containers are given as product per hectare. Multiply the rate by field size in hectares to determine product requirements. Divide by container size to determine the number of containers required. The same procedure is used for determining amount of product for each sprayer tank once you know hectares covered by each tank.

***NOTE:*** In this guide, rates are given as ***PRODUCT PER ACRE.*** Multiply the rate by the field size in acres to determine product requirements. Divide by container size to determine the number of containers required.

The same procedure is used for determining amount of product for each sprayer tank once you know acres covered by each tank.

Example 1 (liquid) Field size is 30 hectares (75 A). Rate of application is 2 litres/hectare (0.81 L/A). Each pail contains 20 litres.

$$\frac{2\ \text{L/ha} \times 30\ \text{ha}}{20\ \text{L}} = 3\ \text{pails} \qquad \text{or} \qquad \frac{0.81\ \text{L/A} \times 75\ \text{A}}{20\ \text{L}} = 3\ \text{pails}$$

Example 2 (granular) Field size is 20 hectares (50 A). Rate of application is 10 kg/ha (4.05 kg/A). Each bag contains 25 kilograms product.

$$\frac{10\ \text{kg/ha} \times 20\ \text{ha}}{25\ \text{kg}} = 8\ \text{bags} \qquad \text{or} \qquad \frac{4.05\ \text{kg/A} \times 50\ \text{A}}{25\ \text{kg}} = 8\ \text{bags}$$

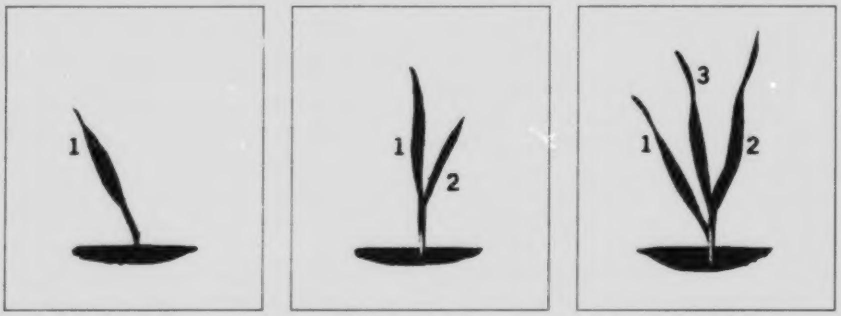
## *Identifying Crop and Weed Leaf Stages*

### Cereals and Annual Grass Weeds

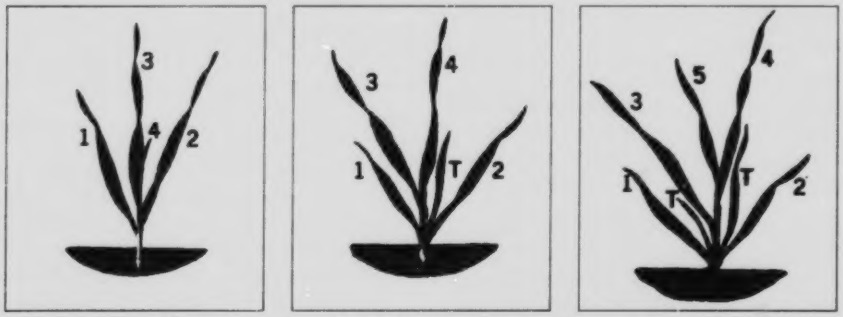
Leaves are counted, starting at one for the first leaf, and progressing up the primary shoot. Tillers are important but not counted as leaves. A leaf should be counted as soon as it emerges, but may be labelled as early, mid or full leaf. The early stage is when it begins to emerge, the full stage is just before the next leaf emerges.

Tillers, or stools, are the secondary shoots of a grass plant. The first tiller emerges from the axil of the first leaf, the second just above the second leaf and so on. Tillers generally appear at the three to four leaf stage. Be sure to identify tillers and only count leaves on the primary shoot. As well, do not remove any leaves from the main shoot when separating the tillers.

FIGURE 5. LEAF STAGES OF CEREALS AND ANNUAL GRASS WEEDS.

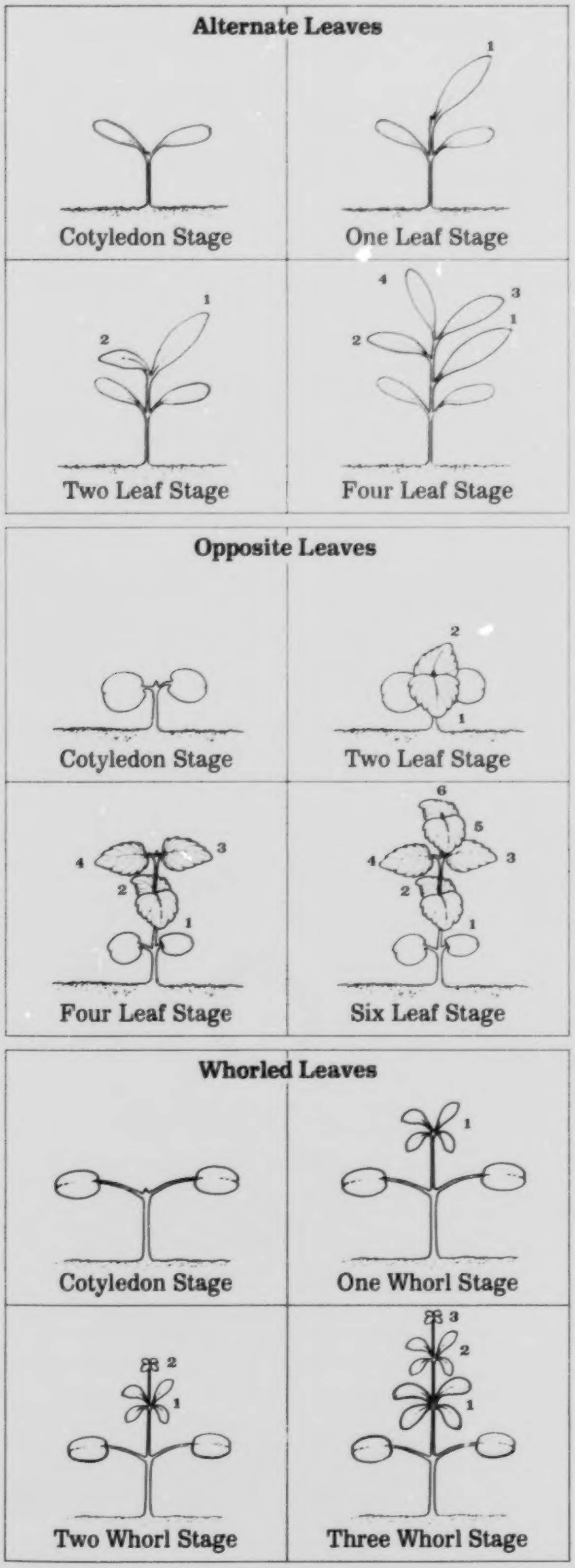


One-Leaf Stage Two-Leaf Stage Three-Leaf Stage



Four-Leaf Stage Four-Leaf Stage (Tillering) Five-Leaf Stage

FIGURE 6. LEAF STAGES OF BROADLEAF CROPS AND WEEDS.


Alternate Leaves
Cotyledon Stage
1
One Leaf Stage
1
2
Two Leaf Stage
4
3
1
2
Four Leaf Stage
Opposite Leaves
Cotyledon Stage
2
1
Two Leaf Stage
4
3
2
1
Four Leaf Stage
6
5
4
3
2
1
Six Leaf Stage
Whorled Leaves
Cotyledon Stage
1
One Whorl Stage
2
1
Two Whorl Stage
3
2
1
Three Whorl Stage

## Broadleaf Weeds

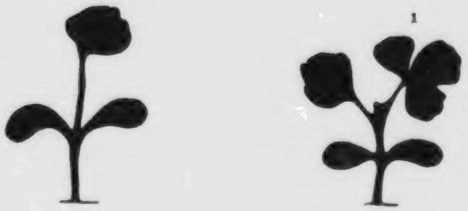
***Cotyledons*** — These are the seed leaves which usually emerge above ground. On some plants, such as fababeans, lentils and peas, they stay below the soil surface. Cotyledons are not true leaves and are not counted when determining leaf number. They are a different shape than the true leaves, and may dry up and disappear at an early stage.

***Alternate leaves*** — Some plants have one leaf at each node on the stem. The next leaf emerges at the next higher node and extends away from the stem in the opposite direction. These plants — lamb's quarters and wild mustard are good examples — are said to have alternate leaves. To determine the leaf stage simply count the number of leaves present (Figure 6).

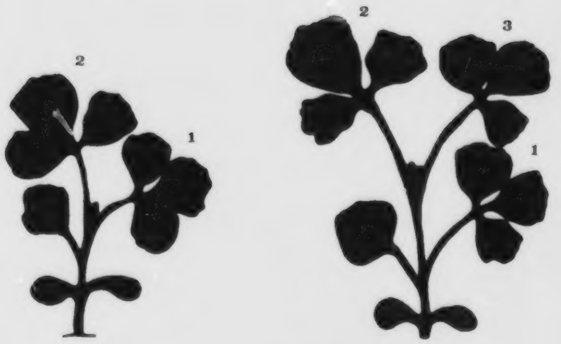
***Opposite leaves*** — Plants with two leaves at each node, one on each side of the stem, are said to have opposite leaves. The next pair of leaves on the next node are rotated about 45° so they are not directly over the previous pair. Plants with opposite leaves have even leaf numbers only. So, when counting, the leaf number progresses from cotyledons to 2 leaf, 4 leaf, etc. These plants generally appear shorter than plants with alternate leaves at a similar leaf stage. **Be sure to count each pair as two leaves.** Hemp nettle is a weed which has opposite leaves (Figure 6).

***Whorled leaves*** — More complex plants like cleavers may have whorled leaves. These plants have three or more leaves at each node on the stem. The leaf number in each whorl may vary, so be sure to count each individual leaf unless the recommendation refers to the number of leaf whorls (Figure 6).

FIGURE 7. STAGES OF ALFALFA, RED CLOVER AND ALSIKE CLOVER LEAF DEVELOPMENT.



unifoliolate first-trifoliolate



second-trifoliolate third-trifoliolate

***Compound leaves*** — Some leaves are made up of several leaflets, forming a compound leaf arrangement. For example, a trifoliolate (frequently called trifoliate) leaf is made up of three leaflets and is characteristic of legumes. The trifoliolate leaves frequently follow one or more unifoliolate leaves. For example, alfalfa produces one unifoliolate leaf first, followed by the trifoliolate leaves (Figure 7).

# *Ag Rep and Weed Supervisor Phone Numbers*

| **Ag Rep Office** | **Phone Number** |
|---|---|
| Altona | 324-6871 |
| Arborg | 376-5212 |
| Ashern | 768-2686 |
| Beausejour | 268-1411 |
| Boissevain | 534-2461 |
| Brandon | 728-5724 |
| Carberry | 834-3349 |
| Carman | 745-2005 |
| Dauphin | 638-9111 |
| Dugald | 853-2051 |
| Ethelbert | 742-3779 |
| Fisher Branch | 372-6526 |
| Gladstone | 385-2856 |
| Hamiota | 764-2767 |
| Killarney | 523-4510 |
| Lundar | 762-5649 |
| Melita | 522-3256 |
| Minnedosa | 867-3961 |
| Morden | 822-5461 |
| Morris | 746-2312 |
| Neepawa | 476-2311 |
| Pilot Mound | 825-2858 |
| Portage La Prairie | 857-9711 |
| Roblin | 937-2158 |
| Russell | 773-2043 |
| St. Pierre | 433-7749 |
| Ste. Rose Du Lac | 447-2116 |
| Selkirk | 482-3922 |
| Shoal Lake | 759-2394 |
| Somerset | 744-2013 |
| Souris | 483-2153 |
| Starbuck | 735-2478 |
| Steinbach | 326-9841 |
| Stonewall | 467-5511 |
| Swan River | 734-3417 |
| Teulon | 886-2696 |
| The Pas | 623-6411 |
| Treherne | 723-2626 |
| Virden | 748-3873 |
| Vita | 425-3436 |

## Weed Supervisor

| **R.M. or L.G.D.** | **Phone Number** |
|---|---|
| Albert | 877-3768 |
| Alexander | 268-1411 |
| Argyle | 744-2049 |
| Armstrong | 376-2939 |
| Arthur | 634-2419 |
| Bifrost | 376-2939 |
| Blanshard | 764-2128 |
| Brenda | 747-2586 |
| Brokenhead | 268-1411 |
| Cameron | 858-2590 |
| Cornwallis | 727-0467 |
| Dauphin | 638-7050 |
| Desalaberry | 433-7265 |
| Edward | 634-2419 |
| Fisher | 376-2939 |
| Franklin | 427-2158 |
| Gilbert Plains | 548-2061 |
| Gimli | 376-2939 |
| Grandview | 546-2639 |
| Hamiota | 764-2128 |
| Hanover | 326-3922 |
| Hillsburg | 937-2158 |
| La Broquerie | 326-3922 |
| Lac Du Bonnet | 268-1411 |
| Langford | 476-5162 |
| Lorne | 744-2049 |
| Louise | 873-2103 |
| MacDonald | 736-2331 |
| Miniota | 764-2128 |
| Montcalm | 746-2571 |
| Morris | 746-2571 |
| North Cypress | 834-3302 |
| North Norfolk | 685-2050 |
| Ochre River | 638-7050 |
| Park (N) | 937-2158 |
| Pembina | 242-2681 |
| Piney | 425-3436 |
| Pipestone | 877-3768 |
| Reynolds | 426-2110 |
| Richot | 433-7265 |
| Riverside | 523-4205 |
| Roblin | 529-2363 |
| Rockwood | 467-2256 |
| Rosedale | 476-5162 |
| Rosser | 467-2256 |
| St. Andrews | 482-3922 |
| Ste. Anne | 326-3922 |
| St. Clements | 482-3922 |
| Shell River | 937-2158 |
| Sifton | 858-2590 |
| South Cypress | 827-2602 |
| South Norfolk | 723-2626 |
| Springfield | 853-2051 |
| Stanley | 822-3940 |
| Stuartburn | 425-3436 |
| Tache | 853-2051 |
| Thompson | 822-3940 |
| Turtle Mountain | 523-4205 |
| Victoria | 526-2423 |
| Wallace | 748-3873 |
| Westbourne | 385-2856 |
| Whitemouth | 348-2949 |
| Winchester | 747-2586 |
| Woodworth | 764-2128 |

# Field Crops

## Cereals

***NOTE: See the Field Crops Chart at back of the Guide for a summary of recommended herbicides and weeds controlled by each product. For cereals underseeded to forage crops, see the Forage Crops section.***

### Barley

**TABLE 1. SUMMARY OF BARLEY RECOMMENDATIONS**

Note: The ratings in this chart give general comparisons based on rates, timing, and other application instructions and precautions as outlined in this Guide. Where two or more brand names are indicated, the weed may not appear on all labels. See Field Crops Chart for complete weed spectrum.

| HERBICIDE | Crop Tolerance | Barnyard Grass | Foxtail, Green and Yellow | Wild Oats | Buckwheat, Wild | Catchfly, Night Flowering | Chickweed | Cleavers | Cow Cockle | Cocklebur | Flixweed | Hemp Nettle | Kochia | Lamb's Quarters | Mustard, Wild | Pigweed, Red Root | Russian Thistle | Shepherd's Purse | Smartweed, Annual Species | Stinkweed | Thistle, Sow (Perennial) | Thistle, Canada | Volunteer Corn | Volunteer Flax | Volunteer Mustard, Rapeseed | Volunteer Sunflowers |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Avadex BW | E | | | G | | | | | | | | | | | | | | | | | | | | | | |
| Avadex BW + Rival/Treflan/Triflurex | E | | G[10] | G | | | | | | | | | | | | | | | | | | | | | | |
| Afolan/Lorox + MCPA | F | | P | | G | | G | | G | G | E[1] | F | G | E | E | G | | E[1] | F | E[1] | | | | | | |
| Ally[8] | | | | | ● | | ● | | ● | | ●[1] | ● | ● | ● | ● | ● | P | ●[1] | ● | | ● | ●[2] | | | ● | |
| Assert 300 LC | G | | | G | P | | | | | | | | | | G | | | | | G[1] | | | | | | |
| Assert + MCPA ester | G | | | F | P | | | | | G | E[1] | | | E | E | | | E[1] | | E[1] | | | | | | |
| Assert + 2,4-D ester | G | | | F | P | | | | | | | | | F | G | | | | | G[1] | | | | | | |
| Avenge | G | | | G | | | | | | | | | | | | | | | | | | | | | | |
| Avenge + Buctril M | G | | | G | E | F | | | G | G | G[1] | | G | E | E | G | G | G[1] | G | G[1] | P[2] | P[2] | | | F | F |
| Avenge + Diphenoprop 600/Estaprop | G | | | G | G | | | | | G | E[1] | | G | E | E | G | G | E[1] | G | E[1] | F[2] | F[2] | | P | G | G |
| Avenge + MCPA ester/2,4-D ester | G | | | G | | | | | | G | E[1] | | | E | E | | G[3] | E[1] | | E[1] | P[2] | P[2] | | | | P |
| Avenge + Pardner | G | | | G | G | P | | | G | F | | | F | G | F | F | G | | G | F[1] | | | | | | |
| Banvel + MCPA/2,4-D | F | | | | G | | | G | G | G | E[1] | F[4] | G | E | E | G | G | E[1] | G | E[1] | F[2] | F[2] | | P[3] | G | F |
| Blagal | G | | | | G | | G | | | | G[1] | F | | E | E | | | G[1] | G | G[1] | | P[2] | | | | |
| Buctril M | E | | | | E | F | | | G | G | G[1] | | G | E | E | G | G | G[1] | G | G[1] | P[2] | P[2] | | | F | F |
| Carbyne 2 EC | G | | | P | | | | | | | | | | | | | | | | | | | | | | |
| Diphenoprop/Estaprop | G | | | | G | | | | | G | E[1] | | G | E | E | G | G | E[1] | G | E[1] | F[2] | F[2] | | P | G | G |
| DyVel | F | | | | G | | | F | G | G | E[1] | F | | E | E | G | G | E[1] | G | E[1] | F[2] | F[2] | | | | F |
| Fortress | G | | G[10] | G | | | | | | | | | | | | | | | | | | | | | | |
| Glean[8] | | | | | ● | | ● | ● | ● | | ●[1] | ● | ● | ● | ● | ● | ● | ●[1] | ● | ●[1] | | ●[2] | | | ● | |
| Hoe Grass 284 | G | G | G | G | | | | | | | | | | | | | | | | | | | F | | | |
| Hoe Grass II | G | G | G | G | G | | | | G | | | | F | G | F | | G | | G | F[1] | | | F | | | |
| Hoe Grass II + MCPA amine | G | F | F | F | G | | | | G | | | | F | G | F | | G | | G | F[1] | | | F | | | |
| Hoe Grass 284 + Pardner | G | G | G | G | G | P | | | G | F | | | F | G | F | F | G | | G | F[1] | | | | | | |
| Hoe Grass 284 + Refine | G | | | G | G | | G | | E | | | E | F | E | E | E | G | | E | G[1] | | | | | G | |
| Kil Mor | F | | | | G | | | G | G | G | E[1] | | | E | E | G | G | E[1] | G | E[1] | F[2] | F[2] | | P | | |
| Lexone/Sencor | F | | | | | G | G | | | | | F | | G | G | F | G | | G | G[1] | | | | | G[6] | |
| Lexone/Sencor + 2,4-D amine/MCPA | F | | | | | G | G | | | | E[1] | F | | E | E | G | G | E[1] | G | E[1] | P[2] | P[2] | | | G[6] | |
| Lexone/Sencor + Banvel | F | | | | G | G | G | | G | | | F | | G | G | G | G | | G | G[1] | F[2] | F[2] | | | G[6] | |
| MCPA | E | | | | | | | | | G | E[1] | | | E | E | | | E[1] | | E[1] | P[2] | P[2] | | | | P |
| MCPAK | E | | | | | | | | | G | E[1] | F | | E | E | | | E[1] | | E[1] | P[2] | P[2] | | | | |
| Pardner | E | | | | G | P | | | G | F | | | F | G | F | F | G | | G | F[1] | | | | | | |
| Pardner + MCPA/2,4-D | E | | | | E | F | | | G | G | G[1] | F[4] | G | E | E | G | G | G[1] | G | G[1] | P[2] | P[2] | | | | F |
| Refine | E | | | | G | | G | | E | | | E | F | E | E | E | G | | E | G[1] | | | | | G | |
| Refine + MCPA Amine | E | | | | G | | G | | E | | | E | F | E | E | E | G | | E | G[1] | | P[2] | | | G | |
| Rival/Treflan/Triflurex | E | | G[10] | | | | | | | | | | | | | | | | | | | | | | | |
| Rival 10 G/Treflan QR 5 | F | G | G[10] | F | F | | G | | G | | | | | G | | G[9] | G | | | | | | | | | |
| Stampede 360 + MCPA ester | F | | G | | G | | | | | | G[1] | | F | E | G | G | | G[1] | G | G[1] | | | | | G | |
| Stampede CM | F | | G | | G | | | | | | G[1] | | F | E | G | G | | G[1] | G | G[1] | | | | | G | |
| Target | F | | | | G | G | | G | G | | E[1] | P | G | E | E | G | G | E[1] | G | E[1] | F[2] | F[2] | | | G | F |
| TCA | F | | F | | | | | | | | | | | | | | | | | | | | | | | |
| TCA + MCPA/2,4-D | F | | F | | | | | | | G | E[1] | | | E | E | | G[3] | E[1] | | E[1] | P[2] | P[2] | | | | P |
| TCA + Buctril M | F | | F | | E | F | | | G | G | G[1] | | G | E | E | G | G | G[1] | G | G[1] | P[2] | P[2] | | | F | F |
| Tordon 202 C | G | | | | G | | | | | G | | | | E | E | G | G | | G | E[1] | P[2] | P[2] | | | | |
| 2,4-D | G | | | | | | | | | G | E[1] | | | E | E | | G | E[1] | | E[1] | P[2] | P[2] | | P[7] | | |

**LEGEND**

| | Crop Tolerance | Weed Control |
|---|---|---|
| E — Excellent | Consistently exhibits a high degree of tolerance over a wide range of growing conditions | Consistently provides a high degree of control over a wide range of growing conditions |
| G — Good | Exhibits acceptable crop tolerance under most growing conditions | Provides acceptable control under most growing conditions |
| F — Fair | Tolerance is variable depending on growing conditions | Control is variable depending on growing conditions |
| P — Poor | Tolerance is often unacceptable | May provide some suppression but control is often unacceptable |

● Labelled for control or suppression

[1] Spring seedlings only. Overwintered rosettes will not be controlled.

[2] Top growth only, regrowth can be expected.

[3] Use 2,4-D mix only.

[4] MCPAK only

[5] Check text for varietal restrictions

[6] Except for triazine tolerant

[7] Use 2,4-D LV ester only

[8] Not recommended for use in Mb. Will not control sulfonyl/urea resistant kochia or Russian thistle.

[9] Rival/Triflurex only.

[10] Will not control trifluralin resistant foxtail.

[11] Will not control sulfonyl/urea resistant kochia and Russian thistle.

## Barley

### *Preplant/Preemergence Incorporated*

Manitoba Agriculture does not recommend fall application of soil incorporated herbicides to summerfallow fields, to soils with light trash cover, to light textured soils or to any other soils which may be predisposed to wind and water erosion as a result of herbicide incorporation.

### *AVADEX BW (400 g/L), AVADEX BW GRANULAR (10%)*

**APPLICATION TIMING:**

a) Crop Stage: preplant and post-plant incorporated
b) Weed Stage: preemergence incorporated

Fall application of granular product must be made after September 15 but before soil freeze-up.

**RATES:**

| APPLICATION | ORGANIC MATTER | | |
|---|---|---|---|
| | Less than 2% | 2 – 4% | Greater than 4% |
| Fall Granular | 4.45 kg/acre | 5.67 kg/acre | 6.88 kg/acre |
| Spring Granular | 5.67 kg/acre | 5.67 kg/acre | 6.88 kg/acre |
| Fall Liquid* | not recommended | not recommended | not recommended |
| Spring Liquid | 1.42 L/acre | 1.42 L/acre | 1.72 L/acre |

* Application of liquid formulations in the fall may predispose fields to erosion and is not recommended.

The granular formulation is more suited to fall application, the liquid to spring application.

**APPLICATION:** Liquid – field sprayer
Granular – granular applicator

**WATER VOLUME:** 45 L/acre water (liquid product only)

**INCORPORATION:** Two incorporations required at right angles for thorough mixing. The first incorporation should be completed as soon as possible on the day of spraying (liquid product) or within 48 hours of application (granular product). The second incorporation for liquid may be done immediately after the first. For best results with granular, delay second incorporation at least 3 to 5 days. Refer to *Herbicide Incorporation* section for detailed incorporation instructions.

**TANK MIXES:**

- Herbicides: Avadex BW liquid can be tank mixed with Rival, Treflan or Triflurex. The tank mixture must be applied after seeding barley.
- Fertilizers: Avadex BW liquid may be applied with liquid fertilizer as a carrier (conduct a compatability test before mixing), or sprayed on dry urea fertilizer (refer to *Herbicide Incorporation* section for mixing and spreading instructions).
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: Moisture is required for activation. Rainfall of at least 0.6 inches (1.5 cm) within 2 weeks of seeding crop is required for optimum results.
- Grazing: Do not graze or harvest for livestock feed.
- Recropping: Will damage domestic oats seeded within 21 months of application.
- Storage: Store liquid formulation above 0° C. Store granular in a cool, dry place.

**ENVIRONMENTAL PRECAUTIONS:** Very dry soil conditions in spring or prolonged cool soil temperatures at time of wild oat germination will result in reduced control.

**COMMENTS:** Poor results may be expected from incomplete incorporation due to wet, cloddy soil, or heavy trash. Ridges left by seeding may disrupt the treated layer and allow weed escapes. Spring application of liquid formulation generally provides a higher level of control than does granular formulation applied in the spring.

### *FORTRESS (14%)*

**Caution: Barley injury can occur if soil conditions are not conducive to rapid barley emergence.**

**Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Fortress will not control trifluralin resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:** Apply in the fall after September 15 but before soil freeze-up or in the spring prior to seeding the crop.

**RATES:**

| Soil Organic Matter | RATE (kg/acre) | |
|---|---|---|
| | Spring | Fall |
| Less than 2% | Not recommended | 4.45 |
| 2 - 4% | 4.45 | 5.67 |
| 4 - 6% | 5.67 | 5.67 |
| Greater than 6% | 6.88 | 6.88 |

**APPLICATION:** Granular applicator. Properly calibrate equipment since over application or overlaps will cause crop injury.

**INCORPORATION:** Two incorporations required at right angles for thorough mixing. First incorporation within 24 hours of application. With fall application the second incorporation can be either in the fall (delay second incorporation at least 3 to 5 days for best results) or in spring. With spring application the first incorporation should be completed within 24 hours of application and prior to seeding the crop. The second incorporation must be delayed for at least 48 hours, but must be done prior to crop emergence. If the second incorporation is done after seeding it should be done with a harrow or other suitable tillage equipment adjusted to a depth so as not to disturb the seed.

If ridging is a problem after seeding, one harrowing is recommended to eliminate the ridging and ensure uniform distribution of the herbicide. Refer to *Herbicide Incorporation* section for additional application and incorporation instructions. Do not incorporate more than 2 inches (5 cm) deep. Deeper incorporation results in reduced weed control and increases risk of crop injury.

**TANK MIXES:**

- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: Moisture is required for activation. Rainfall of at least 0.6 inches (1.5 cm) within 2 weeks of seeding crop is required to ensure optimum results.
- Grazing: Do not graze or harvest for livestock feed.
- Recropping: Fortress will leave a residue in the soil. Oats, sugar beets and small seeded forage grasses may be injured if planted within 24 months of application.
- Storage: Store in a cool dry place.

**ENVIRONMENTAL PRECAUTIONS:** Crop injury can occur on fields where Fortress has been applied and heavy rainfall or cold weather occur after seeding but prior to crop emergence. Seeding under warm soil conditions (greater than 10° C – generally after May 15) to ensure optimum crop germination and emergence will reduce the risk of crop injury. Very dry conditions in spring or prolonged cool soil temperatures at time of wild oat germination will result in reduced control.

**COMMENTS:** To minimize crop injury seed barley 2 to 3 inches (5 to 7.5 cm) deep to ensure seed placement below the treated layer. Don't seed deeper than 3 inches (7.5 cm). Increase the usual seeding rate by 10 per cent.

Use only a double disc press drill or hoe drill for seeding except in the Red River Valley where discer seeders or air seeders can be used on soils having more than 4 per cent organic matter. Air seeders must be equipped with a depth control device to ensure accurate seed placement and reduce risk of crop injury.

Poor results may be expected from incomplete incorporation due to wet, cloddy soil or heavy trash. Ridges left at seeding may disrupt the treated layer and allow weed escapes. Trifluralin-resistant green foxtail will not be controlled.

## RIVAL (500 g/L), TREFLAN EC (545 g/L), TRIFLUREX (400 g/L)

**Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Rival, Treflan or Triflurex will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:**

a) Crop Stage: after seeding but prior to crop emergence

b) Weed Stage: preemergence

**RATES:**

| HERBICIDE | SOIL TEXTURE | |
|---|---|---|
| | light and medium soils | heavy soils |
| Rival | 0.49 L/acre | 0.65 L/acre |
| Treflan EC | 0.45 L/acre | 0.61 L/acre |
| Triflurex | 0.57 L/acre | 0.85 L/acre |

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**INCORPORATION:** Requires two incorporations at right angles. Incorporate as soon as possible after application (within 8 hours) with a tyne or diamond harrow operated at a speed of 8 km/hr (5 mph) or greater. The second incorporation must be done at right angles to the first within 24 hours of application.

**TANK MIXES:**

- Herbicides: Can be tank mixed with Avadex BW liquid.
- Fertilizers: May be applied with liquid fertilizer (eg. 28-0-0) as a carrier. Conduct a compatibility test before mixing.
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: No effect once incorporated.
- Grazing: Do not graze or harvest for livestock feed.
- Recropping: Rival, Treflan and Triflurex leave a residue in the soil which may affect subsequent crops. *See Table 24* for a list of susceptible crops.
- Storage: Do not freeze. If stored below 5° C bring contents to 15° C for 24 hours and shake well before using.

**ENVIRONMENTAL PRECAUTIONS:** Seed barley 2 to 3 inches (5 to 7.5 cm) deep to prevent contact between the chemical and the seed. Avoid soil ridging as this may disrupt the treated layer and allow weed escapes. Extremely heavy foxtail infestations may not be completely controlled, especially if crops are unthrifty.

## RIVAL 10 G (10%), TREFLAN QR 5 (5%)

**Caution: Barley injury can occur if soil conditions are not conducive to rapid barley emergence.**

**Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Rival or Treflan will not control trifluralin-resistant foxtail. Refer to**

**'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:** Fall application only (September 1 to freeze-up).

**RATES:**

| HERBICIDE | SOIL TEXTURE | | | |
|---|---|---|---|---|
| | light texture 2-6% organic matter | medium and heavy texture 2-4% organic matter | medium and heavy texture 4-6% organic matter | heavy texture 6-10% organic matter |
| Rival 10 G | not recommended* | 3.44 kg/acre | 4.45 kg/acre | 5.67 kg/acre |
| Treflan QR 5 | not recommended* | 8.9 kg/acre | 11.3 kg/acre | not recommended |

*The two fall incorporations required may leave light textured soils vulnerable to wind or water erosion. This use is not recommended.

Do not apply to soils containing less than 2% organic matter or to grey-wooded soils. Applications to eroded knolls will result in reduced crop stand. Since application rate is dependent on soil types, do not apply to fields having variable soil types or organic matter contents.

**APPLICATION:** Use a suitable granular applicator. Overapplication or overlapping will result in severe reductions in crop stands.

**INCORPORATION:** Two incorporations required at right angles for thorough mixing. Both incorporations must be done in the fall, the first within 24 hours of application. The second incorporation should be delayed for 3 days after the first. Refer to *Herbicide Incorporation* section for detailed application and incorporation instructions.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: No effect once incorporated into the soil.
- Grazing: Do not graze or harvest for livestock feed.
- Recropping: Rival 10 G and Treflan QR 5 leave a residue in the soil which may affect subsequent crops. *See Table 24* for a list of susceptible crops.
- Storage: Store in a cool dry place.

**ENVIRONMENTAL PRECAUTIONS:** Stresses such as seedling disease, cold weather, deep seeding, excessive moisture, high salt concentration or drought weaken crop seedlings and increase the risk of damage from Rival 10 G and Treflan QR 5. Cold or dry soils in the spring can result in reduced control.

**COMMENTS:** The risk of crop injury can be reduced by seeding the crop no deeper than 2 inches (5 cm) into a warm, moist, firm seed bed. Seed with a press drill or hoe drill. Use of discers or air seeders can result in uneven emergence and crop injury due to the loose seedbed and variable seeding depth.

Do not apply Rival 10 G or Treflan QR 5 to land treated with Rival, Treflan or Triflurex during the previous 18 months. Do not use liquid formulations as severe injury to barley will result.

## Postemergence

### *AFOLAN F (480 g/L) or LOROX L (480 g/L) PLUS MCPA AMINE*

**APPLICATION TIMING:**
a) Crop Stage: 2 to 4 leaf stage
b) Weed Stage: 1 to 4 leaf stage of broadleaved weeds.
1 to 3 leaf stage for green foxtail suppression.

**RATES:** Apply Afolan F at 0.19 to 0.237 L/acre plus 0.45 L/acre MCPA amine (500 g/L).
Apply Lorox L at 0.172 to 0.223 L/acre plus 0.34 to 0.453 L/acre MCPA amine (500 g/L). Use the lower rate when growing conditions and rainfall are above average.

For product volumes of other MCPA amine formulations *refer to Table 21.*

**MIXING:** For mixing, fill the sprayer half full of clean water. Shake the sealed container vigorously. Slowly add the product to the sprayer while agitating. Rinse container three times to ensure that all product has been transferred to the sprayer tank. Add the required amount of MCPA amine and finish filling the tank with water while agitating. Spray as soon as possible after mixing.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 225 to 275 kPa (30 to 40 psi)

**NOZZLES:** Flat fan nozzles with 50 mesh or larger screens and filters.

**TANK MIXES:**
- Herbicides: Must be applied as a tank mixture with MCPA amine.
- Fertilizer: None.
- Insecticides: None

**RESTRICTIONS:**
- Preharvest: Do not apply within 50 days of harvest.
- Rainfall: Within 8 hours will reduce results.
- Grazing: Do not graze or feed green plants to livestock.
- Recropping: No restrictions the year after application.
- Storage: Do not store below 5° C. If stored for 1 year or longer, shake well before using.

**ENVIRONMENTAL PRECAUTIONS:** Do not apply to crops under drought, heat or frost stress.

**COMMENTS:** Do not use formulations of MCPA other than the amine, or crop injury may result. Green foxtail suppression is very erratic and alternative herbicides should be used in fields where green foxtail is a significant problem.

### *ALLY (60%)*

**Caution:** Although Ally is registered for broadleaf weed control in barley, **use of Ally is not recommended in Manitoba.** Recropping restrictions for Ally will severely limit cropping opportunities on fields where it has been used. If you are considering using this product be sure to read the pH restrictions and recropping intervals outlined in this guide and on the product label. Crops not listed in the Ally crop rotation guidelines are very sensitive to low concentrations of this herbicide in the soil. Do not use Ally on soils with a pH above 7.5. Detailed soil tests of your field will be required to accurately determine the pH of your field. Refer to the Soil pH section of this guide for additional information on pH levels and their measurement.

**APPLICATION TIMING:**
a) Crop Stage: 2 leaf to flag leaf stage.
b) Weed Stage: Best results when applied to main flush of young, actively growing weeds.

**RATES:** 0.003 kg/acre

**ADDITIVES:** Add Agsurf, Agral 90, Super Spreader-Sticker or Citowett Plus at 2 L/1000 L of spray solution (an anti-foaming agent such as Halt may be required).

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**TANK MIXES:**
- Herbicides: Ally is registered for tank mixing with 2,4-D amine.
- Fertilizer: None.
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Heavy rainfall immediately after application may cause crop yellowing but will not affect weed control.
- Grazing: May be grazed by or fed to livestock anytime after treatment.
- Recropping: Most rotational crops will be injured by Ally residues in the soil. See recropping guidelines in *Table 24.*
- Storage: Store in a cool dry place.

**ENVIRONMENTAL PRECAUTIONS:** Crops stressed by severe weather conditions, drought, low fertility, water saturated soils, disease or insect damage either before or after application may be injured by Ally.

**COMMENTS:** Although effective in controlling a number of hard to kill weeds, the use of Ally severely restricts cropping options. Due to pH variability and the influence of environmental conditions on Ally degradation in the soil, effects of this herbicide on rotational crops can be unpredictable. Extremely low rates of Ally will injure sensitive crops, so spraying equipment must be thoroughly cleaned using chlorine bleach to deactivate any traces left in the spray tank, lines, or booms. Do not apply Ally to crops underseeded to legumes or grasses as severe injury to these forages will result.

**Caution:** Sulfonyl urea resistant kochia and Russian thistle have developed in Manitoba. Ally will not control these weeds. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.

See the product label for additional use restrictions.

### *ASSERT 300 LC (300 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: 1 to 6 leaf stage.
b) Weed Stage: wild oats — 1 to 4 leaf stage; wild mustard and stinkweed — cotyledon to 6 leaf stage; suppression of wild buckwheat and tartary buckwheat — cotyledon to 4 leaf stage.

**RATES:** 0.53 L/acre when wild oats are in the 1 to 3 leaf stage.
0.65 L/acre when wild oats are in the 4 leaf stage or when tank mixing with 2,4-D ester or MCPA ester.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**
- Herbicides: Assert at 0.65 L/acre can be tank mixed with up to 0.454 L/acre 2,4-D ester (500 g/L) or with up to 0.454 L/acre MCPA ester (500 g/L). For product volumes of other 2,4-D or MCPA ester formulations *see Table 21.* Tank mixes with 2,4-D ester or MCPA ester must be applied after the crop has reached the 4 leaf stage. Allow 5 days between application of Assert and any other herbicide.
- Fertilizer: None.
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 3 hours will reduce results.
- Grazing: Do not graze or harvest treated crop as hay or silage and do not feed straw to livestock.
- Recropping: Grow only spring wheat, canola, spring barley or sunflowers the year after using

Assert in the black and grey soil zones. *See Table 24* for additional information.

**ENVIRONMENTAL PRECAUTIONS:** Do not spray Assert when freezing temperatures are forecast. Control with Assert is reduced under cool, moist growing conditions.

**COMMENTS:** Do not apply more than once per growing season and do not apply to the same field in two successive years, as soil residues will restrict cropping opportunities.

## *AVENGE 280 C (280 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: 1 to 6 leaf stage.
b) Weed Stage: 3 to 5 leaf stage.

**RATES:** 1.01 to 1.21 L/acre
Use the higher rate if wild oat population is greater than 18 wild oats per square foot (200 wild oats per square meter).

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Use flat fan nozzles directed 45° forward.

**TANK MIXES:**
- Herbicides: Avenge 280 C may be tank mixed with Diphenoprop 600, Estaprop, MCPA ester, 2,4-D ester, Buctril M, Pardner. Allow at least 4 days between application of Avenge and any other herbicide.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 6 hours will reduce control.
- Grazing: Do not graze or harvest for livestock feed for 8 weeks after treatment.
- Recropping: No restrictions the year after application.
- Storage: May be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Do not spray if crop is heavy with dew or rain. Do not apply if the crop is stressed from drought or excessive moisture. Do not spray if freezing temperatures are forecast.

**COMMENTS:** Avenge is most effective under warm moist conditions. Performance will be poor under dry conditions. Crop injury may occur during very hot, humid weather.

## *BAR-FOX see TCA*

## *BANVEL (480 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: 2 to 5 leaf stage. Apply at the 2 to 3 leaf stage for optimum crop safety.
b) Weed Stage: 2 to 3 leaf stage and rosettes less than 2 inches (5 cm) across.

**RATES:** Apply 0.093 L/acre tank mixed with 0.344 L/acre MCPA amine (500 g/L) or 2,4-D amine (500 g/L) or with 0.405 L/acre MCPAK (400 g/L). For product volumes of other MCPA or 2,4-D amine formulations *refer to Table 21.*

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**
- Herbicides: MCPA amine, 2,4-D amine, MCPAK. May also be tank mixed with low rates of Lexone or Sencor.
- Fertilizer: None.
- Insecticides: None.

**RESTRICTIONS:**
- Rainfall: Within 8 hours will reduce control.
- Grazing: Do not graze or cut for feed prior to crop maturity.
- Recropping: No restrictions the year after application.
- Storage: May be frozen but must be warmed to room temperature and shaken thoroughly before use.

**ENVIRONMENTAL PRECAUTIONS:** Spray when air temperature is 10 to 25° C. Avoid application when crop is under stress from adverse environmental conditions. Do not spray if risk of frost or severe drop in night temperature is forecast.

**COMMENTS:** Late application will cause crop injury including head and stem deformities. Application under hot, dry conditions or at low water volumes can cause crop injury.

## *BLAGAL (375 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: 2 to 5 leaf stage.
b) Weed Stage: 2 to 5 leaf stage (hemp nettle 2 to 4 leaf stage). For Canada thistle suppression, delay until the crop is in 5 leaf stage.

**RATE:** 0.91 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles with screens 50-mesh or larger.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Blagal and application of other herbicides.

**RESTRICTIONS:**
- Rainfall: Within 4 hours will reduce control.
- Grazing: Do not graze or feed green plants to livestock.
- Recropping: No restrictions the year after application.
- Storage: Not damaged by freezing. To resuspend, let warm and shake well before use.

**COMMENTS:** If spray mixture is allowed to stand for several hours, vigorous agitation is required to resuspend the material. Application after the 5 leaf stage may cause serious crop injury and give poor weed control.

### *BUCTRIL M (560 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: 2 leaf to early shot blade stage
b) Weed Stage: 2 to 4 leaf stage

**RATES:** 0.405 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**
- Herbicides: Avenge, MCPA or TCA.
- Fertilizer: None.
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or cut for feed.
- Recropping: No restrictions the year after application.
- Storage: Does not require heated storage.

**ENVIRONMENTAL PRECAUTIONS:** Avoid spraying during drought. Under conditions of high temperature and humidity, discoloration of cereals may occur.

**COMMENTS:** Since this is a contact herbicide, poor results will occur if there is poor spray coverage. Weeds beyond the 4 leaf stage may outgrow the effects of the herbicide. Top growth of Canada thistle will be burnt off but there will be little effect on the root, so rapid regrowth can be expected. Prolonged cool weather conditions may result in reduced weed control.

### *CARBYNE 2 EC (240 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: Before the 4 leaf stage and no later than 14 days after crop emergence.
b) Weed Stage: 2 leaf stage of wild oats. Optimum control will be achieved by spraying 7 to 10 days after emergence of wild oats. Do not spray later than 14 days after emergence.

**RATES:** 0.6 to 0.7 L/acre. Use the higher rate when wild oat density is 4 plants/square foot (40 plants/square meter) or more, when wild oats are not actively growing, or when wild oats have been injured by frost or wind.

**WATER VOLUME:** 18 L/acre.

**PRESSURE:** 300 kPa (45 psi)

**NOZZLES:** Teejet 650067, 730067, 800067
Delavan LF.67 - 65, LF.77 - 73, LF.67 - 80
Spray Jet – 65.067, TK.74 or D.75
Direct spray 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Do not apply when crop is wet with dew or rain. Rainfall within 15 minutes after application will reduce control.
- Grazing: Do not graze or feed crop for 5 weeks after treatment.
- Recropping: No restrictions the year after application.
- Storage: May be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Crop damage may occur if sprayed within 24 hours of frost. Performs best under cool, moist weather conditions.

**COMMENTS:** Due to the very narrow application timing and the need for strong crop competition for satisfactory control, opportunities for successful use of Carbyne are limited. For heavy infestations or variable leaf stages of wild oats, use of an alternative wild oat herbicide is recommended.

### *DIPHENOPROP 800 (582 g/L), ESTAPROP (582 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: 4 leaf to shot blade stage
b) Weed Stage: 2 to 4 leaf stage

**RATE:** 0.71 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**
- Herbicides: Avenge
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 8 hours of application will reduce control.
- Grazing: Do not graze or cut for feed within 28 days of application.

### Barley

- Recropping: No restrictions the year after application.
- Storage: May be frozen. Shake well prior to use.

**ENVIRONMENTAL PRECAUTIONS:** Crops under stress from adverse environmental conditions such as excess moisture, drought or disease, may be injured by Diphenoprop or Estaprop.

**COMMENTS:** Early application (before the 4 leaf stage) results in crop injury. Dry conditions will reduce control.

## *DYVEL (420 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: 2 to 5 leaf stage. Apply at the 2 to 3 leaf stage for optimum crop safety.

b) Weed Stage: 2 to 3 leaf stage and rosettes less than 2 inches (5 cm) in diameter.

**RATE:** 0.51 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**

- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: Within 8 hours after application will reduce control.
- Grazing: Do not graze or harvest for livestock feed prior to crop maturity.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Do not apply if frost is forecast. Avoid application if crop is under stress from disease or adverse environmental conditions. Best results when applied under good growing conditions and air temperatures are 10 to 25° C.

**COMMENTS:** Crop damage can occur if applied after the 5 leaf stage. Use of lower than recommended water volumes or application under hot, dry conditions can result in crop injury.

## *GLEAN (75%)*

**Caution:** Although Glean is registered for broadleaf weed control in barley, **use of Glean is not recommended in Manitoba.** Recropping restrictions for Glean will severely limit cropping opportunities on fields where it has been used. If you are considering using this product be sure to read the pH restrictions and recropping intervals outlined in this Guide and on the product label. Crops not listed in the Glean crop rotation guidelines are very sensitive to low concentrations of Glean in the soil. Do not use Glean on soils with a pH above 7.5. Detailed soil tests of your field will be required to accurately determine pH for your field. Refer to the soil pH section of this Guide for additional information on pH levels and their measurement.

**APPLICATION TIMING:**

a) Crop Stage: 2 leaf to flag leaf stage.

b) Weed Stage: Best results when applied to small [less than 4 inch (10 cm) tall] actively growing weeds. Wild buckwheat should be in the 1 to 3 leaf stage, cleavers 1 to 2 inches (2.5 to 5.0 cm) tall. Canada thistle can be sprayed up to the bud stage for seasonal control.

**RATE:** 0.006 kg/acre – cow cockle, flixweed, green smartweed, hemp nettle, lady's thumb, lamb's quarters, red root pigweed, shepherd's purse, stinkweed, stork's bill, volunteer rapeseed and wild mustard.

0.009 kg/acre – bluebur, common groundsel, corn spurry and scentless chamomile.

0.012 kg/acre – Canada thistle, cleavers, common chickweed, kochia, Russian thistle and wild buckwheat.

**ADDITIVES:** Add Agsurf, Agral 90, Citowett Plus, Super Spreader-Sticker or Triton XR at a rate of 1 L/1000 L spray solution. Use of a defoaming agent such as Halt may be required.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles with 50-mesh screens. Use only metal or nylon filters.

**TANK MIXES:**

- Herbicides: Although Glean is registered for tank mixing with Avenge 200 C, Hoe-Grass 284 and Stampede 360, none of these tank mixtures are recommended in Manitoba due to recropping restrictions.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: Heavy rainfall immediately after application may cause crop lightening but will not affect weed control.
- Grazing: May be grazed or fed to livestock anytime after treatment.
- Recropping: Most rotational crops will be injured by Glean residues in the soil. *See recropping guidelines in Table 24.*
- Storage: Store in a cool dry place.

**ENVIRONMENTAL PRECAUTIONS:** Weed control will be reduced under dry weather conditions. Crop stress from severe weather conditions, drought, water saturated soil, disease, or insect damage – before or after Glean application – may predispose the crop to Glean injury.

**COMMENTS:** Use of rates lower than those recommended does not reduce recropping restrictions. Due to pH variability of soils and the influence of environmental conditions on Glean degradation in the soil, effects of this herbicide on rotational crops cannot be accurately predicted. Recropping options are severely restricted. Extremely low rates of Glean will injure sensitive crops so spraying equipment must be thoroughly cleaned using chlorine bleach to deactivate any traces left in the spray tank, lines, or booms. Do not use on barley underseeded to legumes or grasses as severe injury to these forages will result.

**Caution:** Sulfonyl urea resistant kochia and Russian thistle have developed in Manitoba. Glean will not control these weeds. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.

See the product label for additional use restrictions.

## *HOE-GRASS 284 (284 g/L)*

**Caution: Do not apply to Norbert, Glenn, Klages or Betzes varieties.**

**APPLICATION TIMING:**

a) Crop Stage: 1 to 4 leaf stage and before tillering. Application after 4 leaf stage of crop will result in crop damage.

b) Weed Stage: wild oats, foxtail, and barnyard grass – 1 to 4 leaf stage and before tillering; Persian darnel – 1 to 3 leaf stage; volunteer corn – 6 to 10 inches (15 to 25 cm) in height.

**RATE:** 1.01 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** 80° flat fan directed 45° forward.

**TANK MIXES:**

- Herbicides: Hoe-Grass 284 at the increased rate of 1.13 L/acre may be tank mixed with 0.405 L/acre Pardner. This mixture will not control wild mustard beyond the 3 leaf stage. Hoe-Grass 284 at the rate of 1.01 to 1.3 L/acre may be tank mixed with 0.008 kg/acre Refine. Do not add surfactant. This tank mix will only control wild oats and Refine-labelled broadleaf weeds. Refer to Refine label for detailed mixing instructions. Allow at least 4 days after the application of Hoe-Grass before application of any other herbicide.
- Fertilizer: None
- Insecticides: Decis

**RESTRICTIONS:**

- Preharvest: Do not apply within 60 days of harvest.
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or harvest for livestock feed prior to crop maturity.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze. Shake well before using.

**ENVIRONMENTAL PRECAUTIONS:** Application under hot (above 27° C) or droughty conditions will result in reduced weed control.

**COMMENTS:** Do not tank mix Hoe-Grass 284 with Pardner or Refine under dry weather conditions or on days when day time temperatures are forecast to exceed 27° C. Under those conditions reduced weed control can be expected. Hoe-Grass provides optimum results under cool, moist conditions and should be applied when the majority of grassy weeds are in the 2 to 3 leaf stage for best results.

## *HOE-GRASS II (310 g/L)*

**Caution: Do not apply to Norbert, Glenn, Klages or Betzes varieties.**

**APPLICATION TIMING:**

a) Crop Stage: 1 to 4 leaf stage and before tillering. Application after 4 leaf stage of crop can result in crop damage.

b) Weed Stage: Wild oats, foxtail and barnyard grass 1 to 4 leaf stage and before tillering; Persian darnel 1 to 3 leaf stage; volunteer corn 6 to 10 inches (15 to 25 cm) tall; wild mustard up to 3 leaf stage; Russian thistle up to 2 inches (5 cm) in height and other broadleaf weeds up to the early 4 leaf stage.

**RATE:** 1.42 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** 80° flat fan directed 45° forward.

**TANK MIXES:**

- Herbicides: Hoe-Grass II may be tank mixed with MCPA amine (500 g/L) at 0.028 L/acre to improve wild mustard control. **Caution: Exceeding the recommended rate of MCPA amine 500 will result in a severe reduction in grassy weed control.** Application of the Hoe-Grass II plus MCPA amine mixture should be avoided under hot, dry conditions as severe reductions in grassy weed control will result. Strong crop competition is required for satisfactory weed control with this tank mix. Allow at least 4 days after application of Hoe-Grass II and any other herbicide. For product volumes of other MCPA amine formulations *see Table 21*.

- Fertilizer: None
- Insecticides: Decis

**RESTRICTIONS:**
- Preharvest: Do not apply within 60 days of harvest.
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or harvest for forage prior to crop maturity.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze. Shake well before use.

**ENVIRONMENTAL PRECAUTIONS:** Application under hot (above 27° C) or dry conditions will result in reduced weed control.

**COMMENTS:** Because this is a contact herbicide thorough spray coverage is essential. Best results are obtained from early applications (2 to 3 leaf stage of grassy and broadleaf weeds). Moderate day time temperatures (18 to 24° C) and good moisture conditions provide optimum results. Control is generally poor under hot (day time highs 27° C or higher) or dry conditions. If both grassy and broadleaf weeds are not in the correct stage of application at the same time use an alternate herbicide.

## *KIL-MOR (485 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: 2 to 3 leaf stage
b) Weed Stage: 2 to 3 leaf stage; cleavers in first to second whorl stage.

**RATE:** 0.344 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 6 hours will reduce control.
- Grazing: Do not graze or feed treated crop to livestock until 7 days after application.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Do not apply when temperature exceeds 27° C and relative humidity is high.

**COMMENTS:** Ensure that proper rate, water volume and timing are used or crop injury will result.

## *LEXONE DF (75%), LEXONE L (480 g/L), SENCOR 500 (500 g/L), SENCOR 75 DF (75%)*

**Caution: Klondike barley is less tolerant to Lexone and Sencor than other barley varieties. Refer to product labels for specific application instructions on this variety.**

**APPLICATION TIMING:**
a) Crop Stage: 2 to 5 leaf stage
b) Weed Stage: Young actively growing weeds less than 2 inches (5 cm) in height or diamter.

To avoid crop injury, barley must be planted at least 2 inches (5 cm) below the soil surface.

**RATE:** Lexone DF – 0.129 to 0.142 kg/acre
Lexone L – 0.172 to 0.223 L/acre
Sencor 500 – 0.172 to 0.223 L/acre
Sencor 75 DF – 0.129 to 0.152 kg/acre

Use the higher rates when weed infestations are heavy and to improve residual control of chickweed.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan. Use 50 mesh or larger line strainer and screens.

**TANK MIXTURES:**
- Herbicides: Lexone L, Lexone DF or Sencor 500 may be tank mixed with 0.34 to 0.453 L/acre MCPA amine (500 g/L) or Sencor 75 DF may be tank mixed with 0.34 to 0.453 L/acre 2,4-D amine (500 g/L) for suppression of top growth of Canada thistle and other 2,4-D or MCPA susceptible weeds. Apply these mixtures at 3 to 4 leaf stage of crop. For product volumes of other MCPA amine or 2,4-D amine formulations *see Table 21*.

  Lexone or Sencor at the low rate may be tank mixed with 0.093 L/acre Banvel to provide control of wild buckwheat and top growth suppression of Canada thistle. Apply when barley is in the 2 to 3 leaf stage. Allow at least 5 days between application of Lexone or Sencor and wild oat herbicides.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Preharvest: Do not apply within 60 days of harvest.
- Rainfall: Within 6 hours will reduce control.
- Grazing: Do not graze or feed to livestock within 30 days of application.
- Recropping: No restrictions the year following postemergence applications of Lexone/-Sencor.
- Storage: Lexone DF, Sencor DF – cool dry place. Lexone L, Sencor 500 – heated storage preferred. If frozen, ensure material has

been thoroughly resuspended by vigorous agitation.

**ENVIRONMENTAL PRECAUTIONS:** Temporary (7 to 10 days) lightening in crop color and a reduction in crop height may be observed, especially if frost or abnormally high temperatures occur within 1 or 2 days after application. If frost occurs, allow a five day interval for crop to recover before applying Sencor or Lexone.

### *LOROX L see AFOLAN F*

### *MCPA AMINE, SODIUM SALT, SODIUM POTASSIUM SALT MIXTURES OR ESTERS*

**APPLICATION TIMING:**

a) Crop Stage: 3 leaf to early shot blade
b) Weed Stage: Actively growing weed seedlings (2 to 4 leaf stage).

**RATE:** 0.51 to 0.69 L/acre of 500 g/L formulations. Use the higher rates under dry or cool weather conditions or with heavy weed infestations. For product volumes of other MCPA formulations *refer to Table 21.*

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**

- Herbicides: MCPA amine – Afolan F, Banvel, Buctril M, Lexone, Lorox L, NaTA TCA, Pardner, Refine
  MCPA ester – Assert 300 LC, Avenge, Avenge + Pardner, Buctril M
  MCPAK – Banvel, Buctril M, Pardner
  MCPA Sodium Salt – Buctril M
  Not all brands are labelled for tank mixing so check product label prior to use. Follow all precautions and restrictions on both product labels.
- Fertilizers: None
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: Within 2 hours of MCPA ester, 4 hours of MCPA amine or 6 hours of MCPA Sodium Salt application will reduce control.
- Grazing: Do not graze cattle or cut for feed within 7 days after spraying.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze amines or sodium salts. Ester formulations may be frozen but should be returned to room temperature and thoroughly shaken prior to use.

**ENVIRONMENTAL PRECAUTIONS:** Do not spray when air temperature is above 27° C. Extremely hard water may reduce performance or cause problems in spraying the product.

**COMMENTS:** If only wild mustard, lamb's quarters and spring seedlings of stinkweed or flixweed are present, the rate of MCPA (500 g/L) can be reduced to 0.34 L/acre.

### *MCPAK (400 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: 3 to 6 leaf stage.
b) Weed Stage: 1 to 4 leaf stage.

**RATE:** 0.85 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**

- Herbicides: MCPAK at 0.405 L/acre with Banvel at 0.093 L/acre
  MCPAK at 0.55 L/acre with Pardner.
  MCPAK at 0.28 L/acre with Buctril M
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: Within 6 hours of application will reduce control.
- Grazing: Do not graze dairy cattle within 7 days after application.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Do not spray when air temperature is above 27° C. Extremely hard water may reduce performance or cause problems in spraying the product.

### *NaTA TCA see TCA*

### *PARDNER (280 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: 2 leaf to early flag leaf, but prior to crop shielding weeds.
b) Weed Stage: 2 to 4 leaf stage. Russian thistle up to 2 inches (5 cm) tall. Wild mustard 1 to 3 leaf stage.

**RATE:** 0.405 to 0.485 L/acre. Use the higher rate for heavier weed infestations or under cool growing conditions.

**APPLICATION VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**TANK MIXES:**

- Herbicides: MCPA, 2,4-D, Hoe-Grass, Avenge
  Do not use 2,4-D mixtures before the 4 leaf stage of crop. Do not use Hoe-Grass mixtures on Betzes, Klages, Glenn or Norbert varieties.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or cut treated crop for forage.
- Recropping: No restrictions the year after application.
- Storage: Does not require heated storage.

**COMMENTS:** This contact herbicide requires thorough spray coverage for satisfactory results. Weeds beyond the 4 leaf stage will outgrow the effect of the herbicide.

## *REFINE (75%)*

**APPLICATION TIMING:**
a) Crop Stage: 2 leaf to early flag leaf.
b) Weed Stage: Emerged, young actively growing weeds less than 4 inches (10 cm) tall or across. For chickweed apply in the 1 to 6 leaf stage before the crop shields the weeds. For wild buckwheat, apply in the 1 to 3 leaf stage when actively growing.

**RATE:** 0.008 kg/acre

**ADDITIVES:** Add Agsurf, Agral 90 or Citowett Plus at 2 litres per 1000 litres spray solution.

**WATER VOLUME:** 45 L/acre. If using flood jet or "Raindrop" nozzles apply 90 L/acre total spray solution.

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan with 50-mesh screens and filters

**MIXING:** Add the proper amount of Refine into the necessary volume of water in the spray tank with agitator running. Continuous agitation is required for a uniform suspension and application. Add the surfactant (Agsurf, Agral 90 or Citowett Plus) as the last ingredient. Antifoaming agent such as Halt may be required.

**TANK MIXES:**
- Herbicides: Refine plus recommended surfactant may be mixed with MCPA amine 500 at 0.405 L/acre. For product volumes of other MCPA amine formulations refer to Table 21.

  Refine plus Hoe-Grass 284 (Do not apply to Norbert, Glenn, Klages and Betzes varieties.) Use Refine at 0.008 kg/acre plus Hoe-Grass 284 at 1.01 to 1.13 L/acre. Do not add surfactant. This tank mix will only control wild oats and Refine-labelled broadleaf weeds. Refer to Refine label for detailed tank mixing instructions.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 8 hours will reduce control.
- Grazing: Must not be grazed or fed to livestock within 7 days of application.
- Recropping: No restrictions the year after application.
- Storage: Store in a cool dry place.

**ENVIRONMENTAL PRECAUTIONS:** Do not apply to crops stressed by severe weather conditions, frost, low fertility, drought, water saturated soils, disease, or insect damage as crop injury may result. Under certain conditions (such as heavy rainfall, prolonged cool weather, frost conditions, wide fluctuations in day/night temperatures) lightening in crop color and a reduction in crop height may occur.

**Caution:** Sulfonyl urea resistant kochia and Russian thistle have developed in Manitoba. Refine will not control these weeds. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.

## *SENCOR see LEXONE*

## *STAMPEDE 360 (360 g/L) + MCPA ESTER, STAMPEDE CM (460 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: 2 to 5 leaf.
b) Weed Stage: 1 to 4 leaf with the majority of green foxtail in the 3 leaf and less than 1 inch (2.5 cm) tall. Broadleaf weeds 2 to 4 leaf.

**RATE:** Stampede CM at 1.11 L/acre. Stampede 360 at 1.11 L/acre plus MCPA ester (500 g/L) at 0.223 L/acre. For product volumes of other MCPA ester formulations *see Table 21*.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan with 50-mesh screens and filters.

**MIXING:** Ensure temperature of spray water is not below 10° C. Otherwise, crystallization of Stampede may occur.

When mixing Stampede 360 add MCPA first to a half-filled spray tank, then add Stampede 360, maintaining agitation during filling. For Stampede CM pour the measured quantity into a partially filled spray tank and while agitating add the remaining water. Do not let spray mixtures stand without agitation.

**TANK MIXES:**
- Herbicides: Stampede 360 should be applied as a tank mixture with MCPA ester.

  Stampede CM – No tank mixes recommended.

  Allow 3 days between application of Stampede and other herbicides. Do not apply Stampede to crops grown on fields in which atrazine or other triazine herbicides (such as Lexone, Sencor, Bladex, Blagal, Marksman, Simadex, Princep, Laddok) have been applied until soil analysis confirms that the triazine residues have completely disappeared.

- Fertilizer: None
- Insecticides: The following insecticides are the only products registered for safe use in the same year that Stampede is applied. Furadan may be used on barley if applied 10 days or longer after an application of Stampede. For Dimethoate (Cygon) or Malathion, allow 14 days after an application of Stampede. The insecticide Decis may be applied at any time before or after the application of Stampede CM. Crops grown from seed treated with dual purpose (insecticide/fungicide) seed dressings may be treated with Stampede.

**RESTRICTIONS:**

- Rainfall: Within 4 hours will reduce control.
- Grazing: Do not graze or harvest for livestock feed prior to crop maturity.
- Recropping: No restrictions the year after application.
- Storage: Do not store at temperatures below -9° C.

**ENVIRONMENTAL PRECAUTIONS:** Best weed control is obtained when relative humidity is high and daily maximum temperatures exceed 21° C. Under hot, dry and low relative humidity conditions, spray during early morning or evening. Do not apply Stampede when daily temperatures remain below 10° C or when they are expected to exceed 30° C. Crops damaged by high wind should be fully recovered before applying Stampede. Avoid spraying if crop is recovering from frost damage or if frost is expected within 24 hours.

**COMMENTS:** Leaf discoloration and burn may occur on the crop, particularly under hot, dry conditions. Under these conditions, early morning or evening spraying is recommended. Stampede is a contact herbicide and thorough coverage is required for best results. Early application (2 to 3 leaf stage of foxtail) is essential. Stampede will not control foxtail or broadleaf weeds that emerge after application.

Do not leave spray solution in sprayer tank overnight.

Stampede 360 is also registered for application without MCPA, however the spectrum of broadleaved weeds controlled and effectiveness of green foxtail control will be reduced. Stampede may be applied using "Floater" spray equipment provided 70 L/acre spray volume and flat fan nozzles are used. Application by aircraft or Spra-Coupe is not recommended.

## *TARGET (400 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: 2 to 3 leaf.
b) Weed Stage: 2 to 3 leaf stage. Hemp nettle before second pair of true leaves are formed. Cleavers in the 1 to 2 whorl stage.

**RATE:** 0.405 to 0.61 L/acre
Use the higher rate under adverse weather conditions, when weed density is high or for cleavers control.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**

- Herbicides: For chickweed control Target may be tank mixed with Sencor 500.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: Within 3 hours will reduce control.
- Grazing: Do not graze or harvest for livestock feed until 7 days after application.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**COMMENTS:** Treatment at other than recommended crop stage will cause injury. Do not let spray mixture stand for long periods of time without agitation.

## *TCA [Bar-fox (83%), NaTA TCA (83%)]*

**APPLICATION TIMING:**

a) Crop Stage: 2 to 4 leaf.
b) Weed Stage: 1 to 2 leaf stage.

**RATE:** Bar-fox – 0.54 kg/acre
NaTA TCA – 0.54 kg/acre
Avoid overlapping. Do not apply on barley seeded less than 2 inches (5 cm) deep.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**MIXING:** To dissolve TCA, gradually pour Bar-fox or NaTA TCA into the spray tank with agitation in operation. Ensure 10 litres or more of water is in the tank for each kilogram of material to be dissolved, prior to slowly pouring in the product. If 2,4-D, MCPA or Buctril M is to be used, add the TCA to the tank first.

**NOZZLES:** Flat fan nozzles with 50 mesh or larger screens. Stainless steel nozzles are recommended because of corrosiveness of these products.

**TANK MIXES:**

- Herbicides: NaTA TCA may be tank mixed with MCPA amine, 2,4-D amine or Buctril M. Bar-fox may be tank mixed with Estemine MCPA or Estemine 2,4-D. If 2,4-D is used in the mixture apply at the 4 leaf stage of the crop.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: A light rain after application is beneficial for activation.
- Grazing: Do not graze treated areas for at least 24 hours.
- Recropping: No restrictions the year after application.
- Storage: Bar-fox and NaTA TCA should be kept in cool, dry storage.

**ENVIRONMENTAL PRECAUTIONS:** Since TCA acts primarily through the soil there will be variations in control with different soil moisture conditions. Control will be reduced under dry soil conditions.

**COMMENTS:** Control of foxtail with TCA is variable and depends on strong crop competition. For heavy infestations of green foxtail use of an alternative green foxtail herbicide is recommended.

## *TORDON 202 C (212 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: 3 to 5 leaf.
b) Weed Stage: 2 to 4 leaf.

**RATE:** 0.81 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**

- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: Within 6 hours will reduce control.
- Grazing: Do not permit meat animals being finished for slaughter or dairy animals to graze treated fields within 2 weeks of treatment.
- Recropping: Do not plant fields treated with Tordon 202 C to alfalfa or sunflowers until at least the third growing season after the year of treatment, or beans, lentils, peas or potatoes until at least the fifth growing season after the year of treatment. Fallow or replant to wheat, barley, oats, flax or rapeseed for two years following treatment. *See Table 24* for additional recropping information. Due to the length of recropping restrictions, the use of Tordon 202 C in Manitoba is not recommended on farms where vegetable crops, pulse crops or forage legumes are included in the crop rotation.
- Storage: Do not freeze.

**COMMENTS:** Straw from crops treated with Tordon 202 C will contain residues of the herbicide. Although this straw is not toxic to livestock, it should not be used for composting or mulching on susceptible broadleaf crops. If straw is used for bedding or animal feed, return the manure to fields to be planted to grain crops, flax, rapeseed, or perennial grasses.

Soil from Tordon 202 C treated fields should not be moved to other areas, nor used to grow susceptible broadleaf plants unless an adequate, sensitive bioassay shows that no detectable picloram is present.

## *2,4-D AMINE, LV ESTER*

**APPLICATION TIMING:**

a) Crop Stage: 4 leaf to early shot blade.
b) Weed Stage: 2 to 4 leaf.

**RATE:** 0.51 to 0.69 L/acre of formulations containing 500 g/L 2,4-D. Use the higher rates under dry or cool weather conditions, with heavy weed infestations or for Canada thistle top growth suppression. For product volumes of other 2,4-D formulations *see Table 21*.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**

- Herbicides: 2,4-D amine – Pardner, Banvel, Sencor, TCA
  2,4-D LV ester – Pardner, Banvel, Avenge, Assert 300 LC, TCA
  When tank mixing follow all precautions and restrictions on both product labels.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: Within 2 hours of ester or 4 hours of amine application will reduce control.
- Grazing: Do not graze for at least 24 hours after treatment.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze amine. Ester may be frozen but should be warmed to room temperature and shaken thoroughly prior to use.

**COMMENTS:** If only wild mustard, lamb's quarters and spring seedlings of stinkweed or flixweed are present, the rate of 2,4-D (500 g/L) can be reduced to 0.34 L/acre.

**For barley underseeded to forage crops see Forage Crops Section.**

# Oats

## TABLE 2 SUMMARY OF OAT RECOMMENDATIONS

Note: The ratings in this chart give general comparisons based on rates, timing, and other application instructions and precautions as outlined in this Guide.
Where two or more brand names are indicated, the weed may not appear on all labels. See Field Crops Chart for complete weed spectrum.

| HERBICIDE | Crop Tolerance | Barnyard Grass | Foxtail, Green and Yellow | Wild Oats | Buckwheat, Wild | Catchfly, Night Flowering | Chickweed | Cleavers | Cow Cockle | Cocklebur | Flixweed | Hemp Nettle | Kochia | Lamb's Quarters | Mustard, Wild | Pigweed, Red Root | Russian Thistle | Shepherd's Purse | Smartweed, Annual Species | Stinkweed | Thistle, Sow (Perennial) | Thistle, Canada | Volunteer Flax | Volunteer Mustard, Rapeseed | Volunteer Sunflowers |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Afolan/Lorox + MCPA | F | | P | | G | | G | | G | G | E[1] | F | G | E | E | G | | E[1] | F | E[1] | | | | | |
| Banvel + MCPA | F | | | | G | | | G | G | G | E[1] | F[3] | G | E | E | G | G | E[1] | G | E[1] | F[2] | F[2] | | G | F |
| Blagal | G | | | | G | | G | | | | G[1] | F | | E | E | | | G[1] | G | G[1] | | P[2] | | | |
| Buctril M | E | | | | E | F | | | G | G | G[1] | | G | E | E | G | G | G[1] | G | G[1] | P[2] | P[2] | | F | F |
| DyVel | F | | | | G | | | F | G | G | E[1] | F | | E | E | G | G | E[1] | G | E[1] | F[2] | F[2] | | | F |
| Glean[4] | | | | | ● | | ● | ● | ● | | ●[1] | ● | ● | ● | ● | ● | ● | ●[1] | ● | ●[1] | | ●[2] | | ● | |
| Kil-Mor | F | | | | G | | | G | G | G | E[1] | | | E | E | G | G | E[1] | G | E[1] | F[2] | F[2] | P | | |
| MCPA | E | | | | | | | | | G | E[1] | | | E | E | | | E[1] | | E[1] | P[2] | P[2] | | | P |
| MCPAK | E | | | | | | | | | G | E[1] | F | | E | E | | | E[1] | | E[1] | P[2] | P[2] | | | |
| Pardner | E | | | | G | P | | | G | F | | | F | G | F | F | G | | G | F[1] | | | | | |
| Pardner + MCPA | E | | | | E | F | | | G | G | G[1] | F[3] | G | E | E | G | G | G[1] | G | G[1] | P[2] | P[2] | | | F |
| Refine[5] | E | | | | G | | G | | E | | | E | F | E | E | E | G | | E | G[1] | | | | G | |
| Refine[5] + MCPA amine | E | | | | G | | G | | E | | | E | F | E | E | E | G | | E | G[1] | | P[2] | | G | |
| Stampede 360 + MCPA Ester | F | | G | | G | | | | | | G[1] | | F | E | G | G | | G[1] | G | G[1] | | | | G | |
| Stampede CM | F | | G | | G | | | | | | G[1] | | F | E | G | G | | G[1] | G | G[1] | | | | G | |
| Target | F | | | | G | G | | G | G | | E[1] | P | G | E | E | G | G | E[1] | G | E[1] | F[2] | F[2] | | G | F |
| TCA | F | | F | | | | | | | | | | | | | | | | | | | | | | |
| TCA + MCPA | F | | F | | | | | | | G | E[1] | | | E | E | | | E[1] | | E[1] | P[2] | P[2] | | | P |
| TCA + Buctril M | F | | F | | E | F | | | G | G | G[1] | | G | E | E | G | G | G[1] | G | G[1] | P[2] | P[2] | | F | F |

**LEGEND**

| | Crop Tolerance | Weed Control |
|---|---|---|
| E — Excellent | Consistently exhibits a high degree of tolerance over a wide range of growing conditions | Consistently provides a high degree of control over a wide range of growing conditions |
| G — Good | Exhibits acceptable crop tolerance under most growing conditions | Provides acceptable control under most growing conditions |
| F — Fair | Tolerance is variable depending on growing conditions | Control is variable depending on growing conditions |
| P — Poor | Tolerance is often unacceptable | May provide some suppression but control is often unacceptable |

● Labelled for control or suppression

[1] Spring seedlings only. Overwintered rosettes will not be controlled.

[2] Top growth only, regrowth can be expected.

[3] MCPAK only

[4] Not recommended for use in Manitoba

[5] Will not control sulfonyl urea resistant strains

## Postemergence

### AFOLAN F (480 g/L) or LOROX L (480 g/L) PLUS MCPA AMINE

**APPLICATION TIMING:**
a) Crop Stage: 1 to 4 leaf stage
b) Weed Stage: 1 to 4 leaf stage of broadleaved weeds. 1 to 3 leaf stage for green foxtail suppression.

**RATES:** Apply Afolan F at 0.19 to 0.237 L/acre plus 0.45 L/acre MCPA amine (500 g/L).
Apply Lorox L at 0.172 to 0.223 L/acre plus 0.34 to 0.453 L/acre MCPA amine (500 g/L). Use the lower rate when growing conditions and rainfall are above average. For product volumes of other MCPA amine formulations *refer to Table 21.*

**MIXING:** For mixing, fill the sprayer half full of clean water. Shake the sealed container vigorously. Slowly add the product to the sprayer while agitating. Rinse container three times to ensure that all product has been transferred to the sprayer tank. Add the required amount of MCPA amine and finish filling the tank with water while agitating. Spray as soon as possible after mixing.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 225 to 275 kPa (30 to 40 psi)

**NOZZLES:** Flat fan nozzles with 50 mesh or larger screens in filter and nozzles.

**TANK MIXES:**
- Herbicides: Afolan and Lorox muxt be applied as a tank mixture with MCPA amine.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Preharvest: Do not apply within 50 days of harvest.
- Rainfall: Within 8 hours will reduce results.
- Grazing: Do not graze or feed green plants to livestock.
- Recropping: No restrictions the year after application.
- Storage: Do not store below 5° C. If stored for 1 year or longer, shake well before using.

**ENVIRONMENTAL PRECAUTIONS:** Do not apply to crops under drought, heat or frost stress.

**COMMENTS:** Do not use formulations of MCPA other than the amine, or crop injury may result. Green foxtail suppression is very erratic and alternative herbicides should be used in fields where green foxtail is a significant problem.

## *BANVEL (480 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: 2 to 5 leaf stage. Apply at the 2 to 3 leaf stage for optimum crop safety.

b) Weed Stage: 2 to 3 leaf stage and rosettes less than 2 inches (5 cm) across.

**RATE:** Apply 0.093 to 0.117 L/acre tank mixed with 0.344 L/acre MCPA amine (500 g/L) or with 0.405 L/acre MCPAK (400 g/L). For product volumes of other MCPA formulations *refer to Table 21*. Use the higher rate for heavy weed infestations and for control of cleavers.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles.

**TANK MIXES:**

- Herbicides: MCPA amine, MCPAK.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: Within 8 hours will reduce control.
- Grazing: Do not graze or cut for feed.
- Recropping: No restrictions the year after application.
- Storage: May be frozen but must be warmed to room temperature and shaken thoroughly before use.

**ENVIRONMENTAL PRECAUTIONS:** Spray when air temperature is 10 to 25° C. Avoid application when crop is under stress from adverse environmental conditions. Do not spray if risk of frost or severe drop in night temperature is forecast.

**COMMENTS:** Late application will cause crop injury including head and stem deformities. Application under hot, dry conditions or at low water volumes can cause crop injury.

## *BAR-FOX see TCA*

## *BLAGAL (375 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: 2 to 5 leaf stage

b) Weed Stage: 2 to 5 leaf stage (hemp nettle 2 to 4 leaf stage). For Canada thistle suppression delay until the crop is in 5 leaf stage.

**RATE:** 0.91 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles with 50-mesh screens.

**TANK MIXES:**

- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: Within 4 hours will reduce control.
- Grazing: Do not graze or feed green plants to livestock.
- Recropping: No restrictions the year after application.
- Storage: Not damaged by freezing. To resuspend, let warm and shake well before use.

**COMMENTS:** If spray mixture is allowed to stand for several hours, vigorous agitation is required to resuspend the material. Application after the 5 leaf stage may cause serious crop injury and give poor weed control.

## *BUCTRIL M (560 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: 2 leaf to early shot blade stage

b) Weed Stage: 2 to 4 leaf stage

**RATES:** 0.405 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**

- Herbicides: Avenge, MCPA, MCPAK, TCA.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or cut for feed before crop maturity.
- Recropping: No restrictions the year after application.
- Storage: Does not require heated storage.

**ENVIRONMENTAL PRECAUTIONS:** Avoid spraying during drought. Under conditions of high temperature and humidity, discoloration of cereals may occur.

**COMMENTS:** Because this is a contact herbicide poor results will occur if there is poor spray coverage. Weeds beyond the 4 leaf stage may outgrow the effects of the herbicide. Top growth of Canada thistle will be burnt off but there will be little effect on the root, so rapid regrowth can be expected. Prolonged cool weather conditions may result in reduced weed control.

## *DYVEL (420 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: 2 to 3 leaf stage

b) Weed Stage: 2 to 3 leaf stage and rosettes less than 2 inches (5 cm) in diameter.

**RATE:** 0.51 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**

- Herbicides: None.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: Within 8 hours after application will reduce control.
- Grazing: Do not graze or harvest for livestock feed prior to crop maturity.
- Recropping: No restrictions the year after application.
- Storage: Requires heated storage.

**ENVIRONMENTAL PRECAUTIONS:** Do not apply if frost is forecast. Avoid application if crop is under stress from disease or adverse environmental conditions. Best results when applied under good growing conditions and air temperatures are 10 to 25° C.

**COMMENTS:** Crop damage can occur if applied after the 5 leaf stage. Use of lower than recommended water volumes or application under hot, dry conditions can result in crop injury.

## *GLEAN (75%)*

**Caution:** Although Glean is registered for broadleaf weed control in oats **use of Glean is not recommended in Manitoba.** Recropping restrictions for Glean will severely limit cropping opportunities on fields where it has been used. If you are considering using this product be sure to read the pH restrictions and recropping intervals outlined in this guide and on the product label. Crops not listed in the Glean crop rotation guidelines are very sensitive to low concentrations of Glean in the soil. Do not use Glean on soils with a pH above 7.5. Detailed soil tests of your field will be required to accurately determine pH for your field. Refer to the Soil pH section of this Guide for additional information on pH levels and their measurement.

**APPLICATION TIMING:**

a) Crop Stage: 2 leaf to flag leaf stage.

b) Weed Stage: Best results when applied to small (less than 4 inch (10 cm) tall) actively growing weeds. Wild buckwheat should be in the 1 to 3 leaf stage, cleavers 1 to 2 inches (2.5 to 5.0 cm) tall. Canada thistle can be sprayed up to the bud stage for seasonal control.

**RATE:** 0.006 kg/acre – cow cockle, flixweed, green smartweed, hemp nettle, lady's thumb, lamb's quarters, red root pigweed, shepherd's purse, stinkweed, stork's bill, volunteer rapeseed and wild mustard.

0.009 kg/acre – bluebur, common groundsel, corn spurry and scentless chamomile.

0.012 kg/acre – Canada thistle, cleavers, common chickweed, kochia, Russian thistle and wild buckwheat.

**ADDITIVES:** Add Agsurf, Agral 90, Citowett Plus, Super Spreader-Sticker or Triton XR at a rate of 1 L/1000 L spray solution. Use of a defoaming agent such as Halt may be required.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles with 50-mesh screens. Use only metal or nylon filters.

**TANK MIXES:**

- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: Heavy rainfall immediately after application may cause crop lightening.
- Grazing: May be grazed by or fed to livestock any time after treatment.
- Recropping: Most crops will be injured by Glean residues in the soil. See recropping guidelines in *Table 24*.
- Storage: Store in a cool dry place.

**ENVIRONMENTAL PRECAUTIONS:** Weed control will be reduced under dry weather conditions. Crop stress from severe weather conditions, drought, water saturated soil, disease, or insect damage, before or after Glean application may predispose the crop to Glean injury.

**COMMENTS:** Use of rates lower than those recommended does not reduce recropping restrictions. Due to pH variability of soils and the influence of environmental conditions on Glean degradation in the soil, effects of this herbicide on rotational crops cannot be accurately predicted, and recropping options are severely restricted. Extremely low rates of Glean will injure sensitive crops so spraying equipment must be thoroughly cleaned using chlorine bleach to deactivate any traces left in the spray tank, lines, or booms. Do not use on oats under-seeded to legumes or grasses as severe injury to these forages will result.

**Caution:** Sulfonyl urea resistant kochia and Russian thistle have developed in Manitoba. Glean will not control these weeds. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.

**See the product label for additional use restrictions.**

### *KIL-MOR (480 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: 2 to 3 leaf stage
b) Weed Stage: 2 to 3 leaf stage, cleavers in first to second whorl stage.

**RATES:** 0.344 to 0.445 L/acre. Use the higher rate for cleavers control.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXTURES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 6 hours will reduce control.
- Grazing: Do not graze or feed treated crop to livestock until 7 days after application.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Do not apply when temperature exceeds 27° C and relative humidity is high.

**COMMENTS:** Ensure that proper rate, water volume and timing are used or crop injury will result.

### *LOROX see AFOLAN*

### *MCPA AMINE, SODIUM SALT, SODIUM POTASSIUM SALT MIXTURES OR ESTERS*

**APPLICATION TIMING:**
a) Crop Stage: 3 leaf to early shot blade
b) Weed Stage: Actively growing weed seedlings (2 to 4 leaf stage).

**RATE:** 0.51 to 0.69 L/acre of 500 g/L formulations. Use the higher rates under dry or cool weather conditions or with heavy weed infestations. For product volumes of other MCPA formulations *refer to Table 21*.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**
- Herbicides: MCPA amine – Afolan F, Banvel, Buctril M, Lorox L, Pardner, Refine
  MCPA ester – Buctril M
  MCPAK – Banvel, Buctril M, Pardner
  MCPA Sodium Salt – Buctril M
  Not all brands are labelled for tank mixing so check product label prior to use. Follow all precautions and restrictions on both product labels.
- Fertilizers: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 2 hours of MCPA ester, 4 hours of MCPA amine or 6 hours of MCPA Sodium Salt application will reduce control.
- Grazing: Do not graze cattle or cut for feed within 7 days after spraying.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Do not spray when air temperature is above 27° C. Extremely hard water may reduce performance or cause problems in spraying the product.

**COMMENTS:** If only wild mustard, lamb's quarters and spring seedlings of stinkweed or flixweed are present, the rate of MCPA (500 g/L) can be reduced to 0.34 L/acre.

### *MCPAK (400 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: 3 to 6 leaf stage.
b) Weed Stage: 1 to 4 leaf stage.

**RATE:** 0.85 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXTURES:**
- Herbicides: MCPAK at 0.405 L/acre with Banvel at 0.093 L/acre.
  MCPAK at 0.55 L/acre with Pardner.
  MCPAK at 0.28 L/acre with Buctril M.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 6 hours of application will reduce control.
- Grazing: Do not graze dairy cattle within 7 days after application.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Do not spray when air temperature is above 27° C. Extremely hard water may reduce performance or cause problems in spraying the product.

### [illegible]

## *PARDNER (280 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: 2 leaf to early flag leaf, but prior to crop shielding weeds.

b) Weed Stage: 2 to 4 leaf stage. Russian thistle to 2 inches (5 cm) tall. Wild mustard 1 to 3 leaf stage.

**RATE:** 0.405 to 0.485 L/acre
Use the higher rate for heavier weed infestations or under cool growing conditions.

**APPLICATION VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**TANK MIXES:**

- Herbicides: Pardner at the lower recommended rate may be tank mixed with MCPA at 0.227 to 0.34 L/acre.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or cut treated crop for forage.
- Recropping: No restrictions the year after application.
- Storage: Does not require heated storage.

**COMMENTS:** This contact herbicide requires thorough spray coverage for satisfactory results. Weeds beyond the 4 leaf stage will outgrow the effect of the herbicide.

## *REFINE (75%)*

**APPLICATION TIMING:**

a) Crop Stage: 2 leaf to shot blade

b) Weed Stage: Young, actively growing weeds less than 4 inches (10 cm) tall or across. For chickweed apply in the 1 to 6 leaf stage before the crop shields the weeds. For wild buckwheat apply in the 1 to 3 leaf stage.

**RATE:** 0.008 kg/acre

**ADDITIVES:** Add Agsurf, Agral 90 or Citowett Plus at 2 L per 1000 L spray solution.

**WATER VOLUME:** 45 L/acre. When using flood jet or "Raindrop" nozzles apply 90 L/acre total spray solution.

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan with 50-mesh screens and filters.

**MIXING:** Add the proper amount of Refine into the tank with agitator running. Continuous agitation is required for a uniform suspension and application. Add the surfactant (Agsurf, Agral 90, or Citowett Plus) as the last ingredient. Antifoaming agent such as Halt may be required.

**TANK MIXES:**

- Herbicides: Refine may be mixed with MCPA amine 500 at 0.405 L/acre plus recommended surfactant. For product volumes of other MCPA amine formulations refer to Table 21.
- Fertilizer: None
- Insecticide: None

**RESTRICTIONS:**

- Rainfall: Within 8 hours will reduce control.
- Grazing: Must not be grazed or fed to livestock within 7 days of application.
- Recropping: No restrictions the year after application.
- Storage: Store in a cool dry place.

**ENVIRONMENTAL PRECAUTIONS:** Do not apply to crops stressed by severe weather conditions, frost, low fertility, drought, water saturated soils, disease, or insect damage as crop injury may result. Under certain conditions (such as heavy rainfall, prolonged cool weather, frost conditions, wide fluctuations in day/night temperatures) lightening in crop color and a reduction in crop height may occur.

**Caution:** Sulfonyl urea resistant kochia and Russian thistle have developed in Manitoba. Refine will not control these weeds. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.

## *STAMPEDE 360 (360 g/L) + MCPA ESTER, STAMPEDE CM (420 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: 2 to 5 leaf

b) Weed Stage: 1 to 4 leaf when the majority of green foxtail is in the 3 leaf stage and less than 1 inch (2.5 cm) tall. Broadleaf weeds 2 to 4 leaf stage.

**RATES:** Stampede CM at 1.11 L/acre or Stampede 360 at 1.11 L/acre plus MCPA ester (500 g/L) at 0.223 L/acre. For product volumes of other MCPA ester formulations *see Table 21.*

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan with 50-mesh screens.

**MIXING:** Ensure temperature of spray water is not below 10° C. Crystallization of Stampede may occur. When mixing Stampede 360 add MCPA first to a half-filled spray tank, then Stampede 360, maintaining agitation during filling. For Stampede CM pour the measured quanitity into a partially filled spray tank and while agitating add the remaining water. Do not let spray mixtures stand without agitation.

**TANK MIXES:**
- Herbicides: Stampede 360 should be applied as a tank mixture with MCPA ester.
  Stampede CM – No tank mixes recommended.
  Allow 3 days between application of Stampede and other herbicides. Do not apply Stampede to crops grown in fields in which atrazine or other triazine herbicides (such as Lexone, Sencor, Bladex, Blagal, Marksman, Simadex, Princep, Laddok) have been applied until soil analysis confirms that the triazine residues have completely disappeared.
- Fertilizer: None
- Insecticides: The following insecticides are the only products registered for safe use in the same year that Stampede is applied. The insecticide Decis may be applied at any time before or after the application of Stampede CM. Dimethoate (Cygon) or Malathion, are the only other insecticides registered for safe use in the same year that Stampede is applied, and should not be applied for 14 days or longer after an application of Stampede.
  Crops grown from seed treated with dual purpose (insecticide/fungicide) seed dressings may be treated with Stampede.

**RESTRICTIONS:**
- Rainfall: Within 4 hours will reduce control.
- Grazing: Do not graze or harvest for livestock feed prior to crop maturity.
- Recropping: No restrictions the year after application.
- Storage: Do not store at temperatures below -9° C.

**ENVIRONMENTAL PRECAUTIONS:** Best weed control is obtained when relative humidity is high and daily maximum temperatures exceed 21° C. Under hot, dry and low relative humidity conditions, spray during early morning or evening. Do not apply Stampede when daily temperatures remain below 10° C or when they are expected to exceed 30° C. Crops damaged by high winds should be fully recovered before applying Stampede. Avoid spraying if crop is recovering from frost damage or if frost is expected within 24 hours.

**COMMENTS:** Leaf discoloration and burn may occur on the crop, particularly under hot, dry conditions. Under these conditions, early morning or evening spraying is recommended. Stampede is a contact herbicide and thorough spray coverage is required for best results. Early application (2 to 3 leaf stage of foxtail) is essential. Stampede will not control foxtail or broadleaf weeds that emerge after application. Stampede 360 is also registered for application without MCPA, however the spectrum of broadleaved weeds controlled and effectiveness of green foxtail control will be reduced.

Do not leave spray solution in sprayer tank overnight.

Stampede may be applied using "Floater" spray equipment provided 70 L/acre spray volume and flat fan nozzles are used. Application by aircraft or Spra-Coupe is not recommended.

## TARGET ([illegible] g/L)

**APPLICATION TIMING:**
a) Crop Stage: 2 to 3 leaf
b) Weed Stage: 2 to 3 leaf stage. Hemp nettle before second pair of true leaves are formed. Cleavers in the 1 to 2 whorl stage.

**RATE:** 0.405 to 0.61 L/acre
Use the higher rate for dense weed infestations, under adverse weather conditions, and for cleavers control.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 3 hours will reduce control.
- Grazing: Do not graze or harvest for livestock feed until 7 days after application.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**COMMENTS:** Treatment at other than recommended crop stage will cause injury. Do not let spray mixture stand for long periods of time without agitation.

## TCA (Bar-fox ([illegible]), NaTA TCA ([illegible]))

**APPLICATION TIMING:**
a) Crop Stage: 2 to 4 leaf
b) Weed Stage: 1 to 2 leaf

**RATE:** Bar-fox – 0.54 to 1.08 kg/acre
NaTA TCA – 0.54 to 1.08 kg/acre
Use the lower rate on light, sandy soils.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**MIXING:** To dissolve TCA, gradually pour Bar-fox or NaTA TCA into the spray tank with agitation in operation. Ensure 10 litres or more of water is in the tank for each kilogram of material to be dissolved, prior to slowly pouring in the product. If MCPA or Buctril M is to be used, add the TCA to the tank first.

**NOZZLES:** Flat fan nozzles with 50-mesh screens. Stainless steel nozzles are recommended because of corrosiveness of these products.

**TANK MIXES:**

- Herbicides: NaTA TCA may be tank mixed with MCPA amine or Buctril M.
  Bar-fox may be tank mixed with Estemine MCPA.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: A light rain after application is beneficial for activation.
- Grazing: Do not graze treated areas for at least 24 hours after application.
- Recropping: No restrictions the year after application.
- Storage: Cool, dry storage.

**ENVIRONMENTAL PRECAUTIONS:** Since TCA acts primarily through the soil there will be variations in control with different soil moisture conditions. Control will be reduced under dry soil conditions.

**COMMENTS:** Control of foxtail with TCA is variable and depends on strong crop competition. For heavy infestations of green foxtail use of an alternative green foxtail herbicide is recommended. Do not apply on oats seeded less than 2 inches (5 cm) deep.

# Rye (Spring or Fall)

## TABLE 3 SUMMARY OF RYE RECOMMENDATIONS

Note: The ratings in this chart give general comparisons based on rates, timing, and other application instructions and precautions as outlined in this Guide.
Where two or more brand names are indicated, the weed may not appear on all labels. See Field Crops Chart for complete weed spectrum.

| HERBICIDE | Crop Tolerance | Barnyard Grass | Foxtail, Green and Yellow | Wild Oats | Buckwheat, Wild | Catchfly, Night Flowering | Chickweed | Cleavers | Cow Cockle | Cocklebur | Flixweed | Hemp Nettle | Kochia | Lamb's Quarters | Mustard, Wild | Pigweed, Red Root | Russian Thistle | Shepherd's Purse | Smartweed, Annual Species | Stinkweed | Thistle, Sow (Perennial) | Thistle, Canada | Volunteer Corn | Volunteer Flax | Volunteer Mustard, Rapeseed | Volunteer Sunflowers |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Avenge[3] | G | | | G | | | | | | | | | | | | | | | | | | | | | | |
| Banvel + 2,4-D[4] | F | | | | G | | | G | G | G | E[1] | | G | E | E | G | G | E[1] | G | E[1] | F[2] | F[2] | | P | G | G |
| Buctril M | E | | | | E | F | | | G | G | G[1] | | G | E | E | G | G | G[1] | G | G[1] | P[2] | P[2] | | | F | F |
| Hoe-Grass 284 | G | G | G | G | | | | | | | | | | | | | | | | | | | F | | | |
| Hoe-Grass II[4] | G | G | G | G | G | | | | G | | | | F | G | F | | G | | G | F[1] | | | F | | | |
| Hoe-Grass II[4] + MCPA amine | G | F | F | F | G | | | | G | | | | F | G | F | | G | | G | F[1] | | | F | | | |
| MCPA | E | | | | | | | | | G | E[1] | | | E | E | | | E[1] | | E[1] | P[2] | P[2] | | | | P |
| Pardner | E | | | | G | P | | | G | F | | | F | G | F | F | G | | G | F[1] | | | | | | |
| 2,4-D | G | | | | | | | | | G | E[1] | | | E | E | | G | E[1] | | E[1] | P[2] | P[2] | | P[5] | | |

**LEGEND**

| | Crop Tolerance | Weed Control |
|---|---|---|
| E — Excellent | Consistently exhibits a high degree of tolerance over a wide range of growing conditions | Consistently provides a high degree of control over a wide range of growing conditions. |
| G — Good | Exhibits acceptable crop tolerance under most growing conditions | Provides acceptable control under most growing conditions |
| F — Fair | Tolerance is variable depending on growing conditions. | Control is variable depending on growing conditions |
| P — Poor | Tolerance is often unacceptable. | May provide some suppression but control is often unacceptable. |

[1] Spring seedlings only. Overwintered rosettes will not be controlled.

[2] Top growth only, regrowth can be expected.

[3] Check text for varietal restrictions.

[4] Spring rye only.

[5] Use 2,4-D LV ester only.

## Postemergence

### AVENGE 280 C (280 g/L)

**Caution: Use on Cougar, Puma, Frontier, Rymin and Kodiak only.**

**APPLICATION TIMING:**
a) Crop Stage: 1 to 6 leaf stage.
b) Weed Stage: 3 to 5 leaf stage.

**RATES:** 1.01 to 1.21 L/acre
Use the higher rate if wild oat population is greater than 18 wild oats per square foot (200 wild oats per square meter).

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Use flat fan nozzles directed 45° forward.

**TANK MIXES:**
- Herbicides: None. Allow at least 4 days between application of Avenge and any other herbicide.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 6 hours will reduce control.
- Grazing: Do not graze or harvest for livestock feed for 8 weeks after treatment.
- Recropping: No restrictions the year after application.
- Storage: May be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Do not spray if crop is heavy with dew or rain.
Do not apply if the crop is stressed from drought or excessive moisture. Do not spray if freezing temperatures are forecast.

**COMMENTS:** Avenge is most effective under warm moist conditions. Performance will be poor under dry conditions. Crop injury may occur during hot, humid weather.

### BANVEL (480 g/L)

**Caution: Spring rye only.**

**APPLICATION TIMING:**
a) Crop Stage: 2 to 3 leaf stage.
b) Weed Stage: 2 to 3 leaf stage and rosettes less than 2 inches (5 cm) across.

**RATES:** Apply 0.093 L/acre tank mixed with 0.344 L/acre 2,4-D amine (500 g/L). For product volumes of other 2,4-D amine formulations *refer to Table 21.*

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles.

**TANK MIXES:**

- Herbicides: Apply Banvel as a tank mix with 2,4-D amine 500 at 0.344 L/acre.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: Within 8 hours will reduce control.
- Grazing: Do not graze or cut for feed prior to crop maturity.
- Recropping: No restrictions the year after application.
- Storage: May be frozen but must be warmed to room temperature and shaken thoroughly before use.

**ENVIRONMENTAL PRECAUTIONS:** Spray when air temperature is 10 to 25° C. Avoid application when crop is under stress from adverse environmental conditions. Do not spray if risk of frost or severe drop in night temperature is forecast.

**COMMENTS:** Application after the 3 leaf stage will cause crop injury including head and stem deformities. Application under hot, dry conditions or at low water volumes can cause crop injury.

## *BUCTRIL M (560 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: 2 leaf to early shot blade stage.
b) Weed Stage: 2 to 4 leaf stage.

**RATE:** 0.405 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**

- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or cut for feed prior to crop maturity.
- Recropping: No restrictions the year after application.
- Storage: Does not require heated storage.

**ENVIRONMENTAL PRECAUTIONS:** Avoid spraying during drought. Under conditions of high temperature and humidity, discoloration of cereals may occur.

**COMMENTS:** Because this is a contact herbicide poor results will occur if there is poor spray coverage. Weeds beyond the 4 leaf stage may outgrow the effects of the herbicide. Top growth of Canada thistle will be burnt off but there will be little effect on the root, so rapid regrowth can be expected. Prolonged cool weather conditions may result in reduced weed control.

## *HOE-GRASS 284 (284 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: No leaf stage restrictions but do not apply within 60 days of harvest.
b) Weed Stage: Wild oats, foxtail and barnyard grass 1 to 4 leaf stage and before tillering; Persian darnel 1 to 3 leaf stage; volunteer corn 6 to 10 inches (15 to 25 cm) in height.

**RATE:** 1.01 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** 80° flat fan directed 45° forward.

**TANK MIXES:**

- Herbicides: Allow at least 4 days after the application of Hoe-Grass before applying any other herbicide.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**

- Preharvest: Do not apply within 60 days of harvest.
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or harvest for livestock feed prior to crop maturity.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze, shake well before using.

**ENVIRONMENTAL PRECAUTIONS:** Application under hot (above 27° C) or droughty conditions will result in reduced weed control.

**COMMENTS:** Under dry weather conditions or on days when day time temperatures are forecast to exceed 27° C, reduced weed control can be expected. Hoe-Grass provides optimum results under cool, moist conditions and should be applied when the majority of grassy weeds are in the 2 to 3 leaf stage for best results.

## *HOE-GRASS II (310 g/L)*

**Caution: Spring rye only.**

**APPLICATION TIMING:**

a) Crop Stage: No leaf stage restriction. Do not apply within 60 days of harvest.
b) Weed Stage: Wild oats, foxtail and barnyard grass 1 to 4 leaf stage and before tillering; Persian darnel 1 to 3 leaf stage; volunteer corn 6 to 10 inches (15 to 25 cm) tall; wild mustard up to 3 leaf stage; Russian thistle up to 2 inch (5 cm) in height, and other broadleaf weeds up to the early 4 leaf stage.

**RATE:** 1.42 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** 80° flat fan directed 45° forward.

**TANK MIXES:**

- Herbicides: Hoe-Grass II may be tank mixed with MCPA amine (500 g/L) at 0.028 L/acre to improve wild mustard control. **Caution: Exceeding the recommended rate of MCPA amine 500 will result in a severe reduction in grassy weed control.** Application of the Hoe-Grass II plus MCPA amine mixture should be avoided under hot, dry conditions as severe reductions in grassy weed control will result. Strong crop competition is required for satisfactory weed control with this tank mix. Allow at least 4 days after application of Hoe-Grass II and any other herbicide. For product volumes of other MCPA amine formulations *see Table 21*.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**

- Preharvest: Do not apply within 60 days of harvest.
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or harvest for forage prior to crop maturity.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze. Shake well before use.

**ENVIRONMENTAL PRECAUTIONS:** Application under hot (above 27° C) or dry conditions will result in reduced weed control.

**COMMENTS:** Because this is a contact herbicide thorough spray coverage is essential. Best results are obtained from early applications (2 to 3 leaf stage of grassy and broadleaf weeds). Moderate day time temperatures (18 to 24° C) and good moisture conditions provide optimum results. Control is generally poor under hot (day time highs 27° C or higher) or dry conditions.

## *MCPA AMINE, SODIUM SALT, SODIUM POTASSIUM SALT MIXTURES OR ESTERS*

**APPLICATION TIMING:**

a) Crop Stage: Spring rye – 2 leaf to early shot blade
Fall rye – after growth commences in the spring but before the early shot blade stage.

b) Weed Stage: Actively growing weed seedlings (2 to 4 leaf stage).

**RATE:** 0.51 to 0.69 L/acre of 500 g/L formulations. Use the higher rates under dry or cool weather conditions or with heavy weed infestations. For product volumes of other MCPA formulations *refer to Table 21*.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**

- Herbicides: MCPA amine – None
  MCPA ester – None
  MCPAK – None
  MCPA Sodium Salt – None
- Fertilizer: Some brands can be mixed with liquid fertilizer (28-0-0). Conduct a compatability test before mixing. Check product label for registered brands.
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: Within 2 hours of application of esters, 4 hours of amines or 6 hours of sodium or potassium salt will reduce control.
- Grazing: Do not graze cattle or cut for feed within 7 days after spraying.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze amine or salt formulations. Ester formulations may be frozen but must be warmed to room temperature and agitated thoroughly prior to use.

**ENVIRONMENTAL PRECAUTIONS:** Do not spray when air temperature is above 27° C. Extremely hard water may reduce performance or cause problems in spraying the product.

**COMMENTS:** If only wild mustard, lamb's quarters and spring seedlings of stinkweed or flixweed are present, the rate of MCPA (500 g/L) can be reduced to 0.34 L/acre.

## *PARDNER (280 g/L)*

**Caution: Fall rye only.**

**APPLICATION TIMING:**

a) Crop Stage: Apply only in the spring prior to early flag leaf and before crop shields weeds.

b) Weed Stage: 2 to 4 leaf stage. Russian thistle up to 2 inches (5 cm) tall. Wild mustard 1 to 3 leaf stage.

**RATE:** 0.405 to 0.485 L/acre. Use the higher rate for heavy weed infestations or under cool growing conditions.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXTURES:**

- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or cut treated crop for forage.
- Recropping: No restrictions the year after application.
- Storage: Does not require heated storage.

**COMMENTS:** These contact herbicides require thorough spray coverage for satisfactory results. Weeds beyond the 4 leaf stage will outgrow the effect of the herbicide.

## [illegible]

**APPLICATION TIMING:**
a) Crop Stage: 4 leaf to early shot blade.
b) Weed Stage: 2 to 4 leaf.

**RATE:** 0.51 to 0.69 L/acre of formulations containing 500 g/L 2,4-D. Use the higher rates under dry or cool weather conditions, with heavy weed infestations or for Canada thistle top growth suppression. For product volumes of other 2,4-D formulations *see Table 21.*

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 2 hours for esters and 4 hours for amines will reduce control.
- Grazing: Do not graze for at least 24 hours after treatment.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze amine formulations. Ester formulations may be frozen but must be warmed to room temperature and thoroughly shaken prior to use.

**COMMENTS:** If only wild mustard, lamb's quarters and spring seedlings of stinkweed or flixweed are present, the rate of 2,4-D (500 g/L) can be reduced to 0.34 L/acre. Only a few brands of 2,4-D are registered for application in the fall. Check product label for registered brands.

**For rye underseeded to forage crops see Forage Crops Section.**

# *Triticale*

## TABLE 4 SUMMARY OF TRITICALE RECOMMENDATIONS

Note: The ratings in this chart give general comparisons based on rates, timing, and other application instructions and precautions as outlined in this Guide.
Where two or more brand names are indicated, the weed may not appear on all labels. See Field Crops Chart for complete weed spectrum.

| HERBICIDE | Crop Tolerance | Barnyard Grass | Foxtail, Green and Yellow | Wild Oats | Buckwheat, Wild | Catchfly, Night Flowering | Chickweed | Cleavers | Cow Cockle | Cocklebur | Flixweed | Hemp Nettle | Kochia | Lamb's Quarters | Mustard, Wild | Pigweed, Red Root | Russian Thistle | Shepherd's Purse | Smartweed, Annual Species | Stinkweed | Thistle, Sow (Perennial) | Thistle, Canada | Volunteer Corn | Volunteer Flax | Volunteer Mustard | Volunteer Sunflowers |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Avenge[2] | G | | | G | | | | | | | | | | | | | | | | | | | | | | |
| Hoe-Grass 284 | G | G | G | G | | | | | | | | | | | | | | | | | | | F | | | |
| Hoe-Grass 284 + Pardner | G | G | G | G | G | P | | | G | F | | | F | G | F | F | G | | G | F[1] | | | F | | | |
| Hoe-Grass II | G | G | G | G | G | | | | G | | | | F | G | F | F | G | | G | F[1] | | | F | | | |
| Hoe-Grass II + MCPA amine | G | F | F | F | G | | | | G | | | | F | G | F | F | G | | G | F[1] | | | F | | | |
| Mataven L | E | | | G | | | | | | | | | | | | | | | | | | | | | | |
| Pardner | E | | | | G | P | | | G | F | | | F | G | F | F | G | | G | F[1] | | | | | | |

**LEGEND**

| | Crop Tolerance | Weed Control |
|---|---|---|
| E — Excellent | Consistently exhibits a high degree of tolerance over a wide range of growing conditions. | Consistently provides a high degree of control over a wide range of growing conditions. |
| G — Good | Exhibits acceptable crop tolerance under most growing conditions. | Provides acceptable control under most growing conditions. |
| F — Fair | Tolerance is variable depending on growing conditions. | Control is variable depending on growing conditions. |
| P — Poor | Tolerance is often unacceptable. | May provide some suppression but control is often unacceptable. |

[1] Spring seedlings only. Overwintered rosettes will not be controlled.

[2] Check text for varietal restrictions.

## Postemergence

### AVENGE 280 C (280 g/L)

**Caution: Use on Welsh and Carman varieties only.**

**APPLICATION TIMING:**
a) Crop Stage: 1 to 6 leaf stage.
b) Weed Stage: 3 to 5 leaf stage.

**RATES:** 1.01 to 1.21 L/acre
Use the higher rate if wild oat population is greater than 18 wild oats per square foot (200 wild oats per square meter).

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Use flat fan nozzles directed 45° forward.

**TANK MIXES:**
- Herbicides: None. Allow at least 4 days between application of Avenge and any other herbicide.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 6 hours will reduce control.
- Grazing: Do not graze or harvest for livestock feed for 8 weeks after treatment.
- Recropping: No restrictions the year after application.
- Storage: May be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Do not spray if crop is heavy with dew or rain. Do not apply if the crop is stressed from drought or excessive moisture. Do not spray if freezing temperatures are forecast.

**COMMENTS:** Avenge is most effective under warm moist conditions. Performance will be poor under dry conditions. Crop injury may occur during hot, humid weather.

### HOE-GRASS 284 (284 g/L)

**APPLICATION TIMING:**
a) Crop Stage: No leaf stage restrictions. Do not apply within 60 days of harvest.
b) Weed Stage: Wild oats, foxtail, barnyard grass 1 to 4 leaf stage and before tillering; Persian darnel 1 to 3 leaf stage; volunteer corn 6 to 10 inches (15 to 25 cm) in height.

**RATE:** 1.01 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** 80° flat fan directed 45° forward.

**TANK MIXES:**
- Herbicides: Hoe-Grass 284 at the increased rate of 1.13 L/acre may be tank mixed with 0.405 L/acre Pardner. This mixture will not control wild mustard beyond the 3 leaf stage.

Allow at least 4 days after the application of Hoe-Grass before applying any other herbicides.

- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**

- Preharvest: Do not apply within 60 days of harvest.
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or harvest for livestock feed prior to crop maturity.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze. Shake well before using.

**ENVIRONMENTAL PRECAUTIONS:** Application under hot (above 27° C) or droughty conditions will result in reduced weed control.

**COMMENTS:** Don't tank mix Hoe-Grass 284 with Pardner under dry weather conditions or on days when day time temperatures are forecast to exceed 27° C. Under those conditions reduced weed control can be expected. Hoe-Grass provides optimum results under cool, moist conditions and should be applied when the majority of grassy weeds are in the 2 to 3 leaf stage for best results.

### *HOE-GRASS II (310 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: No leaf stage restriction but do not apply within 60 days of harvest.

b) Weed Stage: Wild oats, foxtail and barnyard grass 1 to 4 leaf stage and before tillering; Persian darnel 1 to 3 leaf stage; volunteer corn 6 to 10 inches (15 to 25 cm) tall; wild mustard up to 3 leaf stage; Russian thistle up to 2 inches (5 cm) in height, and other broadleaf weeds up to the early 4 leaf stage.

**RATE:** 1.42 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** 80° flat fan directed 45° forward.

**TANK MIXES:**

- Herbicides: Hoe-Grass II may be tank mixed with MCPA amine (500 g/L) at the reduced rate of 0.028 L/acre to improve wild mustard control. **Caution: Exceeding the recommended rate of MCPA amine 500 will result in a severe reduction in grassy weed control.** Application of the Hoe-Grass II plus MCPA amine mixture should be avoided under hot, dry conditions as severe reductions in grassy weed control will result. Strong crop competition is required for satisfactory weed control with this tank mix. Allow at least 4 days after application of Hoe-Grass II and before application of any other herbicide.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**

- Preharvest: Do not apply within 60 days of harvest.
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or harvest for forage prior to crop maturity.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze. Shake well before use.

**ENVIRONMENTAL PRECAUTIONS:** Applications under hot (above 27° C) or dry conditions will result in reduced weed control.

**COMMENTS:** Because this is a contact herbicide thorough spray coverage is essential. Best results are obtained from early applications (2 to 3 leaf stage of grassy and broadleaf weeds). Moderate day time temperatures (18 to 24° C) and good moisture conditions provide optimum results. Control is generally poor under hot (day time highs 27° C or higher) or dry conditions.

### *MATAVEN L (52.5 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: Up to and including 6 leaf stage.

b) Weed Stage: 3 to 6 leaf stage.

**RATE:** 2.02 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 300 kPa (45 psi)

**NOZZLES:** Flat fan directed 45° forward.

**TANK MIXES:**

- Herbicides: None
- Fertilizer: None
- Insecticides: None

To avoid reduced control of wild oats an interval of 4 days is required between Mataven and Pardner.

**RESTRICTIONS:**

- Rainfall: Within 2 hours will reduce control.
- Grazing: Do not graze or harvest for forage.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Mataven provides consistent wild oat control over a wide range of environmental conditions.

**COMMENTS:** When wild oat infestations are heavy, treatment at the early stage (3 to 4 leaf) will maximize crop yields by reducing competition. Later treatments, when wild oats are more mature (4 to 6 leaf), will provide more complete control of late emerging wild oats. Any wild oats in the 2 leaf stage or younger will escape and grow to maturity.

Agitation will be required to re-emulsify spray if allowed to stand for several hours in the spray tank.

[redacted]

**APPLICATION TIMING:**

a) Crop Stage: Apply in the spring only, prior to early flag leaf and before crop shields weeds.
b) Weed Stage: 2 to 4 leaf stage. Russian thistle up to 2 inches (5 cm) tall. Wild mustard 1 to 3 leaf stage.

**RATE:** Pardner – 0.405 to 0.485 L/acre
Use the higher rate for heavier weed infestations or under cool growing conditions.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**

- Herbicides: Pardner at 0.405 L/acre may be tank mixed with Hoe-Grass 284 at 1.13 L/acre.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or cut treated crop for forage.
- Recropping: No restrictions the year after application.
- Storage: Does not require heated storage.

**COMMENTS:** These contact herbicides require thorough spray coverage for satisfactory results. Weeds beyond the 4 leaf stage will outgrow the effect of the herbicide. Under prolonged cool growing conditions control will be reduced.

# Wheat, Spring and Durum

## TABLE 5 SUMMARY OF WHEAT RECOMMENDATIONS

Note: The ratings in this chart give general comparisons based on rates, timing, and other application instructions and precautions as outlined in this Guide.
Where two or more brand names are indicated, the weed may not appear on all labels. See Field Crops Chart for complete weed spectrum.

| HERBICIDE | Crop Tolerance | Barnyard Grass | Foxtail, Green and Yellow | Wild Oats | Buckwheat, Wild | Catchfly, Night Flowering | Chickweed | Cleavers | Cow Cockle | Cocklebur | Flixweed | Hemp Nettle | Kochia | Lamb's Quarters | Mustard, Wild | Pigweed, Red Root | Russian Thistle | Shepherd's Purse | Smartweed, Annual Species | Stinkweed | Thistle, Sow (Perennial) | Thistle, Canada | Volunteer Corn | Volunteer Flax | Volunteer Mustard, Rapeseed | Volunteer Sunflowers |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Avadex BW | G | | | G | | | | | | | | | | | | | | | | | | | | | | |
| Avadex BW + Rival/Treflan/ Triflurex | E | | G[13] | G | | | | | | | | | | | | | | | | | | | | | | |
| Afolan or Lorox + MCPA | F | | P | | G | | G | | G | G | E[1] | F | G | E | E | G | | E[1] | F | E[1] | | | | | | |
| Ally[6] [14] | | | | | ● | ● | | | ● | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ●[2] | | | ● | |
| Assert 300 LC[12] | G | | | G | P | | | | | | | | | | G | | | | | G | | | | | | |
| Assert 300 LC[12] + 2,4-D LV ester | G | | | F | P | | | | | | | | | F | G | | | | | G | | | | | | |
| Assert 300 LC[12] + MCPA ester | G | | | F | P | | | | | G | E[1] | | | E | E | | | E[1] | | E[1] | | | | | | |
| Avenge[5] | G | | | G | | | | | | | | | | | | | | | | | | | | | | |
| Avenge[5] + Buctril M | G | | | G | E | F | | | G | G | G[1] | | G | E | E | G | G | G[1] | G | G[1] | P[2] | P[2] | | | F | F |
| Avenge[5] + Diphenoprop 600/Estaprop | G | | | G | G | | | | | G | E[1] | | G | E | E | G | G | E[1] | G | E[1] | F[2] | F[2] | | P | G | G |
| Avenge[5] + MCPA ester or 2,4-D ester | G | | | G | | | | | | G | E[1] | | | E | E | | G[3] | E[1] | | E[1] | P[2] | P[2] | | | | P |
| Avenge[5] + Pardner | G | | | G | G | P | | | G | F | | | F | G | F | F | G | | G | F[1] | | | | | | |
| Banvel + MCPA or 2,4-D | G | | | | G | | | G | G | G | E[1] | F[4] | G | E | E | G | G | E[1] | G | E[1] | F[2] | F[2] | | P[7] | G | F |
| Blagal | G | | | | G | | G | | | | G[1] | F | | E | E | | | G[1] | G | G[1] | | P[2] | | | | |
| Buctril M | E | | | | E | F | | | G | G | G[1] | | G | E | E | G | G | G[1] | G | G[1] | P[2] | P[2] | | | F | F |
| Carbyne 2 EC | G | | | P | | | | | | | | | | | | | | | | | | | | | | |
| Diphenoprop 600/Estaprop | G | | | | G | | | | | G | E[1] | | G | E | E | G | G | E[1] | G | E[1] | F[2] | F[2] | | P | G | G |
| DyVel | G | | | | G | | | F | G | G | E[1] | F | G | E | E | G | G | E[1] | G | E[1] | F[2] | F[2] | | | | F |
| Fortress | F | | G[13] | G | | | | | | | | | | | | | | | | | | | | | | |
| Glean[6] [14] | | | | | ● | | ● | ● | ● | | ●[1] | ● | ● | ● | ● | ● | ● | ●[1] | ● | ●[1] | | ●[2] | | | ● | |
| Hoe-Grass 284 | G | G | G | G | | | | | | | | | | | | | | | | | | | F | | | |
| Hoe-Grass 284 + Pardner | G | G | G | G | G | P | | | G | | | | F | G | F | | G | | G | F[1] | | | F | | | |
| Hoe Grass 284 + Refine[14] | G | | | G | G | | G | | E | | | E | F | E | E | E | G | | E | G[1] | | | | | G | |
| Hoe-Grass II | G | G | G | G | G | | | | G | | | | F | G | F | | G | | G | F[1] | | | F | | | |
| Hoe-Grass II + MCPA amine | G | F | F | F | G | | | | G | | | | F | G | F | | G | | G | F[1] | | | F | | | |
| Kil-Mor | G | | | | G | | | G | G | G | E[1] | | | E | E | G | G | E[1] | G | E[1] | F[2] | F[2] | | P | | |
| Laser[10] | F | | G | | E | F | | | G | G | G[1] | | G | E | E | G | G | G[1] | G | G[1] | P[2] | P[2] | | | | |
| Lexone/Sencor | F | | | | | G | G | | | | | F | | G | G | F | G | | G | G[1] | | | | | G[8] | |
| Lexone/Sencor + MCPA or 2,4-D | F | | | | | G | G | | | G | E[1] | F | | E | E | G | G | E[1] | G | E[1] | P[2] | P[2] | | | G[8] | |
| Lexone/Sencor + Banvel | F | | | | G | G | G | | G | | | F | | G | G | G | G | | G | G[1] | F[2] | F[2] | | | G[8] | |
| Mataven L[5] | E | | | G | | | | | | | | | | | | | | | | | | | | | | |
| MCPA | E | | | | | | | | | G | E[1] | | | E | E | | | E[1] | | E[1] | P[2] | P[2] | | | | P |
| MCPAK | E | | | | | | | | | G | E[1] | F | | E | E | | | E[1] | | E[1] | P[2] | P[2] | | | | |
| Pardner | E | | | | G | P | | | G | F | | | F | G | F | F | G | | G | F[1] | | | | | | |
| Pardner + MCPA/2,4-D | E | | | | E | F | | | G | G | G[1] | F[4] | G | E | G | G | G | G[1] | G | G[1] | P[2] | P[2] | | | | F |
| Refine[14] | E | | | | G | | G | | E | | | E | F | E | E | E | G | | E | G[1] | | | | | G | |
| Refine[14] + MCPA Amine | E | | | | G | | G | | E | | | E | F | E | E | E | G | | E | G[1] | | P[2] | | | G | |
| Rival/Treflan/Triflurex | E | | G[13] | | | | | | | | | | | | | | | | | | | | | | | |
| Rival 10G/Treflan QR5[11] | F | | G[13] | | | | | | | | | | | | | | | | | | | | | | | |
| Stampede 360 + 2,4-D ester | F | | G | | G | | | | | G | G[1] | | F | E | G | G | G | G[1] | G | G[1] | | | | | G | |
| Stampede CM or Stampede 360 + MCPA ester | F | | G | | G | | | | | | G[1] | | F | E | G | G | | G[1] | G | G[1] | | | | | G | |
| Target | G | | | | G | G | | G | G | | E[1] | P | G | E | E | G | G | E[1] | G | E[1] | F[2] | F[2] | | | G | F |
| Tordon 202 C | G | | | | G | | | | | G | | | | E | E | G | G | | G | E[1] | P[2] | P[2] | | | | |
| 2,4-D | G | | | | | | | | | G | E[1] | | | E | E | | G | E[1] | | E[1] | P[2] | P[2] | | P[9] | | |

**LEGEND**

| | Crop Tolerance | Weed Control |
|---|---|---|
| E — Excellent | Consistently exhibits a high degree of tolerance over a wide range of growing conditions | Consistently provides a high degree of control over a wide range of growing conditions. |
| G — Good | Exhibits acceptable crop tolerance under most growing conditions. | Provides acceptable control under most growing conditions. |
| F — Fair | Tolerance is variable depending on growing conditions. | Control is variable depending on growing conditions. |
| P — Poor | Tolerance is often unacceptable. | May provide some suppression but control is often unacceptable. |

● Labelled for control or suppression.

[1] Spring seedlings only. Overwintered rosettes will not be controlled.

[2] Top growth only, regrowth can be expected.

[3] Use 2,4-D for Russian thistle control.

[4] MCPAK only.

[5] Check text for varietal restrictions.

[6] Not recommended for use in Manitoba. Will not control sulfonyl urea resistant kochia or Russian thistle.

[7] Use Banvel + 2,4-D only.

[8] Except for triazine tolerant varieties.

[9] Use LV ester only.

[10] Do not use on durum wheat, for Hard Red Spring Wheat only.

[11] Fall Application only.

[12] Do not use on durum wheat.

[13] Will not control trifluralin-resistant foxtail.

[14] Will not control sulfonyl urea resistant kochia or Russian thistle.

**Wheat (Spring and Durum)**

## Preplant/Preemergence Incorporated

Manitoba Agriculture does not recommend fall application of soil incorporated herbicides to summerfallow fields, to soils with light trash cover, to light textured soils or to any other soils which may be predisposed to wind and water erosion as a result of herbicide incorporation.

### AVADEX BW (400) & AVADEX BW GRANULAR (10%)

**Caution: Wheat must be seeded below the treated layer, or crop injury will occur.**

**APPLICATION TIMING:**

a) Crop Stage: preplant and postplant incorporated.
b) Weed Stage: preemergence incorporated.

Fall application of granular product must be made after September 15 but before soil freeze-up.

**RATES:**

| Application | SOIL ORGANIC MATTER | | |
|---|---|---|---|
| | Less than 2% | 2 - 4% | Greater than 4% |
| Granular Fall | 4.45 kg/acre | 5.66 kg/acre | 6.87 kg/acre |
| Granular Spring (before seeding**) | 4.45 kg/acre | 4.45 kg/acre | 5.66 kg/acre |
| Granular Spring (after seeding) | 5.66 kg/acre | 5.66 kg/acre | 6.87 kg/acre |
| Liquid Spring (before seeding**) | 1.21 L/acre | 1.21 L/acre | 1.42 L/acre |
| Liquid Spring (after seeding) | 1.42 L/acre | 1.42 L/acre | 1.72 L/acre |

****Caution:** Do not apply Avadex BW before seeding wheat in soils with 4% or less organic matter where discers are to be used for the seeding operation. If an air seeder is to be used, it must be equipped with a depth control device to ensure accurate seed placement otherwise crop injury can occur. Wild oat control may be less consistent with the lower rate of Avadex BW applied prior to seeding in the spring.

**Note:** The granular formulation is more suited to fall application, the liquid to spring application. Although the liquid formulation is registered for application in the fall, this use is not recommended as the application may predispose fields to erosion.

**APPLICATION:** Liquid – field sprayer.
Granular – granular applicator.

**WATER VOLUME:** 45 L/acre (liquid product only)

**INCORPORATION:** Two incorporations required at right angles for thorough mixing. The first incorporation should be completed as soon as possible on the day of spraying (liquid product) or within 48 hours of application (granular product). The second incorporation for liquid may be done immediately after the first. For best results with granular, delay second incorporation at least 3 to 5 days. Refer to *Herbicide Incorporation* section for detailed incorporation instructions.

**TANK MIXES:**

- Herbicides: Avadex BW liquid can be tank mixed with Rival, Treflan or Triflurex. The tank mixture can only be applied after seeding wheat.
- Fertilizers: Avadex BW liquid may be applied with liquid fertilizer as a carrier (conduct a compatability test before mixing), or sprayed on dry urea fertilizer (refer to *Herbicide Incorporation* section for mixing and spreading instructions).
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: Moisture is required for activation. Rainfall of at least 0.6 inches (1.5 cm) within 2 weeks of seeding crop is required for optimum results.
- Grazing: Do not graze or harvest treated crop for livestock feed.
- Recropping: Will damage domestic oats seeded within 21 months of application.
- Storage: Do not freeze.

**COMMENTS:** Poor results may be expected from incomplete incorporation due to wet, cloddy soil, or heavy trash. Very dry soil conditions in spring or prolonged cool soil temperatures at time of wild oat germination will also result in reduced control. Ridges left by seeding may disrupt the treated layer and allow escapes. Spring application of liquid formulation generally provides a higher level of control than does granular formulation applied in the spring.

### FORTRESS (14%)

Caution: **Trifluralin-resistant green foxtail has developed in Manitoba. Fortress will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:** Apply in the fall after September 15 but before soil freeze-up, or in the spring prior to seeding the crop.

**RATES:**

| Soil Organic Matter | RATE (kg/acre) | |
|---|---|---|
| | Spring | Fall |
| Less than 2% | Not recommended | Not recommended |
| 2 - 4% | Not recommended | 4.45 |
| 4 - 6% | 4.45 | 5.67 |
| Greater than 6% | 5.67 | 5.67 |

**APPLICATION:** Granular applicator. Properly calibrate equipment, since overapplication or overlaps will cause crop injury.

## Wheat (Spring and Durum)

**INCORPORATION:** First incorporation within 24 hours. With fall application, the second incorporation can be either in the fall (delay second incorporation at least 3-5 days for best results) or in spring. With spring application the first incorporation should be completed within 24 hours of application and prior to seeding the crop. The second incorporation must be delayed for at least 48 hours, but must be done prior to crop emergence. If the second incorporation is done after seeding it should be done with a harrow or other suitable tillage equipment adjusted to a depth so as not to disturb the seed. If ridging is a problem after seeding, one harrowing is recommended to eliminate the ridging and ensure uniform distribution of the herbicide. Refer to *Herbicide Incorporation* section for additional application and incorporation instructions. Do not incorporate more than 2 inches (5 cm) deep. Deeper incorporation results in reduced weed control and increases risk of crop injury.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Moisture is required for activation. Rainfall of at least 0.6 inches (1.5 cm) within 2 weeks of seeding crop is required to ensure optimum results.
- Grazing: Do not graze or harvest treated crop for livestock feed.
- Recropping: Fortress will leave a residue in the soil. Oats, sugar beets and small seeded forage grasses may be injured if planted within 24 months of application.
- Storage: Store in a cool dry place.

**COMMENTS:** To minimize crop injury seed wheat 2 to 3 inches (5 to 7.5 cm) deep to ensure seed placement below the treated layer. Don't seed deeper than 3 inches (7.5 cm). Increase the usual seeding rate by 10 percent.

Use only a double disc press drill or hoe drill for seeding except in the Red River Valley where discer seeders or air seeders can be used on soils having more than 4 percent organic matter. Air seeders must be equipped with a depth control device to ensure accurate seed placement and reduce risk of crop injury. Crop injury can occur on fields where Fortress has been applied and heavy rainfall or cold weather occur after seeding but prior to crop emergence. Seeding under warm soil conditions (greater than10° C – generally after May 15) to ensure optimum crop germination and emergence will reduce the risk of injury. Poor results may be expected from incomplete incorporation due to wet, cloddy soil or heavy trash. Very dry conditions in spring or prolonged cool soil temperatures at time of wild oat germination will also result in reduced control. Ridges left at seeding may disrupt the treated layer and allow weed escapes. Trifluralin tolerant green foxtail will not be controlled.

## [illegible]

**Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Rival, Treflan or Triflurex will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:**

a) Crop Stage: After seeding but prior to crop emergence.

b) Weed Stage: preemergence.

**RATES:**

| HERBICIDE | Light and Medium Soil Texture | Heavy Soil Texture |
|---|---|---|
| Rival | 0.49 L/acre | 0.65 L/acre |
| Treflan EC | 0.45 L/acre | 0.61 L/acre |
| Triflurex | 0.57 L/acre | 0.85 L/acre |

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**INCORPORATION:** Incorporate as soon as possible after application (within 8 hours) with a tyne or diamond harrow operated at a speed of 8 km/hr (5 mph) or greater. A second incorporation must be done at right angles to the first within 24 hours of application. See the *Herbicide Incorporation* section for detailed incorporation instructions.

**TANK MIXES:**
- Herbicides: Can be tank mixed with Avadex BW liquid.
- Fertilizers: May be applied with liquid fertilizer (eg. 28-0-0) as a carrier. Conduct a compatability test before mixing.
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: No effect once incorporated.
- Grazing: Do not graze or harvest treated crop for livestock feed.
- Recropping: Rival, Treflan and Triflurex leave a residue in the soil which may affect subsequent crops. *See Table 24* for a list of susceptible crops.
- Storage: Do not freeze. If stored below 5° C, bring contents to 15° C for 24 hours and shake well before using.

**COMMENTS:** Seed wheat 2 to 3 inches (5 to 7.5 cm) deep to prevent contact between the chemical and the seed. Avoid soil ridging as this may disrupt the treated layer and allow weed escapes. Extremely heavy foxtail infestations may not be completely controlled, especially if crops are unthrifty.

### RIVAL (10%) / TREFLAN QR 5 (5%)

**Caution: Wheat injury can occur if soil conditions are not conducive to rapid wheat emergence. Do not apply Rival 10 G or Treflan QR 5 for wheat on fields which have been treated with trifluralin (Fortress, Rival, Treflan, Triflurex) during the previous 16 months. Application to eroded knolls will result in reduced crop stands.**

**Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Rival or Treflan will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:** Fall application only - after September 1, but before soil freeze up.

**RATES:**

| Herbicide | All Soils 2 - 8% Organic Matter |
|---|---|
| Rival 10 G | 2.23 kg/acre |
| Treflan QR 5 | 4.45 kg/acre |

**APPLICATION:** Granular applicator. Properly calibrate equipment, since over-application or overlaps will cause crop injury.

**INCORPORATION:** Incorporate with cultivators or disc implements only. Deep tillage cultivators do not provide the best mixing action, but may be needed for the first incorporation if trash conditions warrant it. Do not delay the first incorporation more than 24 hours after application.

Incorporate at a working speed of 8 to 13 km/hr (5 to 8 mph). The second incorporation must be delayed at least 5 days after the first and must be done at right angles to the first incorporation. The second incorporation may be done in the fall or in the spring prior to seeding the crop. Both incorporations must be to a depth of 2 to 3 inches (5 to 8 cm). Subsequent workings must be no deeper than 3 inches (8 cm). Do not apply and incorporate when soil is in poor working condition (wet, lumpy or cloddy). Do not incorporate with rodweeders, harrows or hoe drills. Refer to *Herbicide Information* section for more details on incorporation.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: No effect once incorporated.
- Grazing: Do not graze or harvest treated crop for livestock feed.
- Recropping: Rival 10 G and Treflan QR 5 leave a residue in the soil which may affect subsequent crops. See *Table 24* for a list of susceptible crops.
- Storage: Do not store in direct sunlight, store in a cool dry place.

**COMMENTS:** Seed wheat at 1.5 to 2.5 inches (3 to 6 cm) deep into a warm, moist seed bed. Shallow seeding is especially important for semi-dwarf varieties. The seed bed should be firmly packed or harrowed after seeding to promote good germination.

## Postemergence

### AFOLAN F (450 g/L) or LOROX L (480 g/L) PLUS MCPA AMINE

**APPLICATION TIMING:**
- a) Crop Stage: 2 to 4 leaf stage.
- b) Weed Stage: 1 to 4 leaf stage of broadleaved weeds. 1 to 3 leaf stage for green foxtail suppression.

**RATES:** Apply Afolan F at 0.19 to 0.237 L/acre plus 0.45 L/acre MCPA amine (500 g/L).

Apply Lorox L at 0.172 to 0.223 L/acre plus 0.34 to 0.453 L/acre MCPA amine (500 g/L). Use the lower rate when growing conditions and rainfall are above average. For product volumes of other MCPA amine formulations *refer to Table 21*.

**MIXING:** Fill the sprayer half full of clean water. Shake the sealed container vigorously. Slowly add the product to the sprayer while agitating. Rinse container three times to ensure that all product has been transferred to the sprayer tank. Add the required amount of MCPA amine and finish filling the tank with water while agitating. Spray as soon as possible after mixing.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 225 to 275 kPa (30 to 40 psi)

**NOZZLES:** Flat fan nozzles with 50-mesh screens in filter and nozzles.

**TANK MIXES:**
- Herbicides: Must be applied as a tank mixture with MCPA amine.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Preharvest: Do not apply within 50 days of harvest.
- Rainfall: Within 8 hours will reduce results.
- Grazing: Do not graze or feed green plants to livestock.
- Recropping: No restrictions the year after application.

- Storage: Do not store below 5° C. If stored for 1 year or longer, shake well before using.

**ENVIRONMENTAL PRECAUTIONS:** Do not apply to crops under drought, heat or frost stress.

**COMMENTS:** Do not use formulations of MCPA other than the amine, or crop injury may result. Green foxtail suppression is very erratic and alternative herbicides should be used in fields where green foxtail is a significant problem.

## ALLY (60%)

**Caution:** Although Ally is registered for broadleaf weed control in wheat, **use of Ally is not recommended in Manitoba.** Recropping restrictions for Ally will severely limit cropping opportunities on fields where it has been used. If you are considering using this product be sure to read the pH restrictions and recropping intervals outlined in this Guide and on the product label. Crops not listed in the Ally crop rotation guidelines are very sensitive to low concentrations of Ally in the soil. Do not use Ally on soils with a pH above 7.5. Detailed soil tests of your field will be required to accurately determine the pH of your field. Refer to the *Soil pH* section of this Guide for additional information on pH levels and their measurement.

**APPLICATION TIMING:**
a) Crop Stage: 2 leaf to flag leaf stage.
b) Weed Stage: Best results when applied to main flush of young actively growing weeds.

**RATE:** 0.003 kg/acre

**ADDITIVES:** Add Agsurf, Agral 90, Super Spreader-Sticker or Citowett Plus at 2 L per 1000 L of spray solution (an anti-foaming agent such as Halt may be required).

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**TANK MIXES:**
- Herbicides: Although Ally is registered for tank mixing with 2,4-D amine, this use is not recommended in Manitoba.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Heavy rainfall immediately after application may cause crop yellowing.
- Grazing: May be grazed or fed to livestock any time after treatment.
- Recropping: Most rotational crops can be injured by Ally residues in the soil. *See recropping guidelines in Table 24.*
- Storage: Store in a cool dry place.

**ENVIRONMENTAL PRECAUTIONS:** Crops stressed by severe weather conditions, drought, low fertility, water saturated soils, disease or insect damage either before or after application may be injured by Ally.

**COMMENTS:** Although effective in controlling a number of hard to kill weeds the use of Ally severely restricts cropping options. Due to pH variability and the influence of environmental conditions on Ally degradation in the soil, effects of this herbicide on rotational crops can be unpredictable. Extremely low rates of Ally will injure sensitive crops so spraying equipment must be thoroughly cleaned using chlorine bleach to deactivate any traces left in the spray tank, lines, or booms. Do not apply Ally to crops underseeded to legumes or grasses as severe injury to these forages will result. See the product label for additional use restrictions. Effectiveness will be reduced if spray mixture remains in the tank for more than 24 hours.

**Caution:** Sulfonyl urea resistant kochia and Russian thistle have developed in Manitoba. Ally will not control these weeds. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.

## ASSERT 300 LC (300 g/L)

**Caution: Do not use on durum wheat.**

**APPLICATION TIMING:**
a) Crop Stage: 1 to 6 leaf stage.
b) Weed Stage: Wild oats 1 to 4 leaf stage; wild mustard and stinkweed cotyledon to 6 leaf stage; suppression of wild buckwheat and tartary buckwheat cotyledon to 4 leaf stage.

**RATES:** 0.53 L/acre when wild oats are in the 1 to 3 leaf stage.
0.65 L/acre when wild oats are in the 4 leaf stage or when tank mixing with 2,4-D ester or MCPA ester.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**
- Herbicides: Assert at 0.65 L/acre can be tank mixed with up to 0.454 L/acre 2,4-D ester (500 g/L) or with up to 0.454 L/acre MCPA ester (500 g/L). For product volumes of other 2,4-D ester or MCPA ester formulations *see Table 21*. Tank mixes with 2,4-D ester or MCPA ester must be applied after the crop has reached the 4 leaf stage. Allow 5 days between application of Assert and any other herbicide.
- Fertilizer: None
- Insecticides: None

### Wheat (Spring and Durum)

**RESTRICTIONS:**
- Rainfall: Within 3 hours will reduce results.
- Grazing: Do not graze or harvest treated crop for forage.
- Recropping: Grow only spring wheat (including durum), canola, spring barley or sunflowers the year after using Assert in the black and grey soil zones. *See Table 24* for additional recropping restrictions.

**ENVIRONMENTAL PRECAUTIONS:** Do not spray Assert when freezing temperatures are forecast. Control with Assert is reduced under cool, moist growing conditions.

**COMMENTS:** Do not apply more than once per growing season and do not apply to the same field in two successive years, as soil residues will restrict cropping opportunities.

## *AVENGE 200 C (250 g/L)*

**Caution: Use on Benito, Canuck, Chester, Columbus, Fielder, Glenlea, HY 320, Katepwa, Leader, Macoun, Neepawa and Selkirk varieties only.**

**APPLICATION TIMING:**
- a) Crop Stage: 1 to 6 leaf stage.
- b) Weed Stage: 3 to 5 leaf stage.

**RATE:** 1.01 to 1.21 L/acre.
Use the higher rate if wild oat population is greater than 18 wild oats per square foot (200 wild oats per square meter).

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Use flat fan nozzles directed 45° forward.

**TANK MIXES:**
- Herbicides: Avenge may be tank mixed with Diphenoprop 600, Estaprop, MCPA ester, 2,4-D ester, Buctril M, Pardner. Allow at least 4 days between application of Avenge and any other herbicide.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 6 hours will reduce control.
- Grazing: Do not graze or cut crop for feed for 8 weeks after treatment.
- Recropping: No restrictions the year following application.
- Storage: May be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Do not spray if crop is heavy with dew or rain. Do not apply if the crop is stressed from drought or excessive moisture. Do not spray if freezing temperatures are forecast.

**COMMENTS:** Avenge is most effective under warm moist conditions. Performance will be poor under dry conditions. Crop injury may occur during hot, humid weather.

## *BANVEL (480 g/L)*

**APPLICATION TIMING:**
- a) Crop Stage: 2 to 5 leaf stage. Apply at the 2 to 3 leaf stage for optimum crop safety.
- b) Weed Stage: 2 to 3 leaf stage and rosettes less than 2 inches (5 cm) across.

**RATES:** Apply 0.093 to 0.117 L/acre tank mixed with 0.344 L/acre MCPA amine (500 g/L) or 2,4-D (500 g/L) or with 0.405 L/acre MCPAK (400 g/L). For product volumes of other MCPA or 2,4-D amine formulations *refer to Table 21*. Use the higher rate under poor growing conditions and for cleavers control.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**
- Herbicides: MCPA amine, 2,4-D amine, MCPAK. May also be tank mixed with low rates of Lexone or Sencor.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 8 hours will reduce control.
- Grazing: Do not graze or cut for feed prior to crop maturity.
- Recropping: No restrictions the year after application.
- Storage: May be frozen but must be warmed to room temperature and shaken thoroughly before use.

**ENVIRONMENTAL PRECAUTIONS:** Spray when air temperature is 10° C to 25° C. Avoid application when crop is under stress from adverse environmental conditions. Do not spray if risk of frost or severe drop in night temperature is forecast.

**COMMENTS:** Late application will cause crop injury including head and stem deformities. Application under hot, dry conditions or at low water volumes can cause crop injury.

## *BLAGAL (375 g/L)*

**APPLICATION TIMING:**
- a) Crop Stage: 2 to 5 leaf stage.
- b) Weed Stage: 2 to 5 leaf stage (hemp nettle 2 to 4 leaf stage). For Canada thistle suppression delay until the crop is in 5 leaf stage.

**RATE:** 0.91 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles with 50-mesh screens.

**Wheat (Spring and Durum)**

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Blagal and wild oat herbicide application.

**RESTRICTIONS:**
- Rainfall: Within 4 hours will reduce control.
- Grazing: Do not graze or feed green plants to livestock.
- Recropping: No restrictions the year after application.
- Storage: Not damaged by freezing. To resuspend, let warm and shake well before use.

**COMMENTS:** If spray mixture is allowed to stand for several hours, vigorous agitation is required to resuspend the material. Application after the 5 leaf stage may cause serious crop injury and give poor weed control.

## *BUCTRIL M (560 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: 2 leaf to early shot blade stage.
b) Weed Stage: 2 to 4 leaf stage.

**RATES:** 0.405 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**
- Herbicides: MCPA, MCPAK, Avenge (varietal restrictions apply. See Avenge recommendation.)
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or cut for feed.
- Recropping: No restrictions the year after application.
- Storage: Does not require heated storage.

**ENVIRONMENTAL PRECAUTIONS:** Avoid spraying during drought. Under conditions of high temperature and humidity, discoloration of cereals may occur.

**COMMENTS:** Because this is a contact herbicide poor results will occur if there is poor spray coverage. Weeds beyond the 4 leaf stage may outgrow the effects of the herbicide. Top growth of Canada thistle will be burnt off but there will be little effect on the root, so rapid regrowth can be expected. Prolonged cool weather conditions may result in reduced weed control.

## *CARBYNE 2 EC (240 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: Before the 4 leaf stage and no later than 14 days after crop emergence.
b) Weed Stage: 2 leaf stage of wild oats. Optimum control will be achieved by spraying 7 to 10 days after emergence of wild oats. Do not spray later than 14 days after emergence.

**RATE:** 0.6 to 0.7 L/acre. Use the higher rate when wild oat density is 4 plants/square foot (40 plants/square meter) or more, when wild oats are not actively growing, or when wild oats have been injured by frost or wind.

**WATER VOLUME:** 18 L/acre

**PRESSURE:** 300 kPa (45 psi)

**NOZZLES:** Teejet 650067, 730067, 800067
Delavan LF.67 - 65, LF.77 - 73, LF.67 - 80
Spray Jet – 65.067, TK.75 or D.75
Direct spray 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Do not apply when crop is wet with dew or rain. Rainfall within 15 minutes after application will reduce control.
- Grazing: Do not graze or feed crop for 5 weeks after treatment.
- Recropping: No restrictions the year after application.
- Storage: May be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Crop damage may occur if sprayed within 24 hours of frost. Performs best under cool, moist weather conditions.

**COMMENTS:** Due to the very narrow application timing and the need for strong crop competition for satisfactory control, opportunities for successful use of Carbyne are limited. For heavy infestations or variable leaf stages of wild oats use of an alternative wild oat herbicide is recommended.

## *DIPHENOPROP 600 (563 g/L), ESTAPROP (562 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: 4 leaf to shot blade.
b) Weed Stage: 2 to 4 leaf.

**RATE:** 0.71 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**Wheat (Spring and Durum)**

**TANK MIXTURES:**
- Herbicides: Avenge (varietal restrictions apply. See Avenge recommendation.)
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 8 hours of application will reduce control.
- Grazing: Do not graze or cut for feed within 28 days of application.
- Recropping: No restrictions the year after application.
- Storage: May be frozen. Shake well prior to use.

**ENVIRONMENTAL PRECAUTIONS:** Crops under stress from adverse environmental conditions such as excess moisture, drought or disease, may be injured by Diphenoprop 600 or Estaprop.

**COMMENTS:** Early application (before the 4 leaf stage of the crop) results in crop injury. Dry conditions will reduce control.

## *DYVEL (420 g/L)*

**APPLICATION TIMING:**
- a) Crop Stage: 2 to 5 leaf stage. Apply at the 2 to 3 leaf stage for optimum crop safety.
- b) Weed Stage: 2 to 3 leaf stage and rosettes less than 2 inches (5 cm) in diameter.

**RATE:** 0.51 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 8 hours after application will reduce control.
- Grazing: Do not graze or harvest for livestock feed prior to crop maturity.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Do not apply if frost is forecast. Avoid application if crop is under stress from disease or adverse environmental conditions. Best results when applied under good growing conditions and air temperatures are 10 to 25° C.

**COMMENTS:** Crop damage can occur if the chemical is applied after the 5 leaf stage. Use of lower than recommended water volumes or application under hot, dry conditions can result in crop injury.

## *ESTAPROP and DIPHENOPROP*

## *GLEAN (75%)*

**Caution:** Although Glean is registered for broadleaf weed control in wheat **use of Glean is not recommended in Manitoba.** Recropping restrictions for Glean will severely limit cropping opportunities on fields where it has been used. If you are considering using this product be sure to read the pH restrictions and recropping intervals outlined in this Guide and on the product label. Crops not listed in the Glean crop rotation guidelines are very sensitive to low concentrations of Glean in the soil. Do not use Glean on soils with a pH above 7.5. Detailed soil tests of your field will be required to accurately determine pH for your field. *Refer to the Soil pH section* of this Guide for additional information on pH levels and their measurement.

**APPLICATION TIMING:**
- a) Crop Stage: 2 leaf to flag leaf stage.
- b) Weed Stage: Best results when applied to small (less than 4 inch (10 cm) tall) actively growing weeds. Wild buckwheat should be in the 1 to 3 leaf stage, cleavers 1 to 2 inches (2.5 to 5 cm) tall. Canada thistle can be sprayed up to the bud stage for seasonal control.

**RATES:** 0.006 kg/acre – cow cockle, flixweed, green smartweed, hemp nettle, lady's thumb, lamb's quarters, red root pigweed, shepherd's purse, stinkweed, stork's bill, volunteer rapeseed and wild mustard.
0.009 kg/acre – bluebur, common groundsel, corn spurry and scentless chamomile.
0.012 kg/acre – Canada thistle, cleavers, common chickweed, kochia, Russian thistle and wild buckwheat.

**ADDITIVES:** Add Agsurf, Agral 90, Citowett Plus, Super Spreader-Sticker or Triton XR at a rate of 1 L/1000 L spray solution. Use of a defoaming agent such as Halt may be required.

**WATER VOLUME:** 45 L/acre.

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles with 50-mesh screens. Use only metal or nylon filters.

**TANK MIXES:**
- Herbicides: Although Glean is registered for tank mixing with Avenge, Hoe-Grass 284, Mataven and Stampede 360, none of these tank mixtures are recommended in Manitoba due to recropping restrictions.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Heavy rainfall immediately after application may cause crop lightening but will not affect weed control.

- Grazing: May be grazed by or fed to livestock any time after treatment.
- Recropping: Most rotational crops will be injured by Glean residues in the soil. *See recropping guidelines in Table 24.*
- Storage: Store in a cool dry place.

**ENVIRONMENTAL PRECAUTIONS:** Weed control will be reduced under dry weather conditions. Crop stress from severe weather conditions, drought, water saturated soil, disease, or insect damage, before or after Glean application may predispose the crop to Glean injury.

**COMMENTS:** Use of rates lower than those recommended does not reduce recropping restrictions. Due to pH variability of soils and the influence of environmental conditions on Glean degradation in the soil, effects of this herbicide on rotational crops cannot be accurately predicted, and recropping options are severely restricted. Extremely low rates of Glean will injure sensitive crops so spraying equipment must be thoroughly cleaned using chlorine bleach to deactivate any traces left in the spray tank, lines, or booms. Do not use on wheat underseeded to legumes or grasses as severe injury to these forages will result. See the product label for additional use restrictions.

**Caution:** Sulfonyl urea resistant kochia and Russian thistle have developed in Manitoba. Glean will not control these weeds. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.

## *HOE-GRASS 284 (284 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: No leaf stage restrictions but do not apply within 60 days of harvest.

b) Weed Stage: Wild oats, foxtail and barnyard grass 1 to 4 leaf stage and before tillering; Persian darnel 1 to 3 leaf stage; volunteer corn 6 to 10 inches (15 to 25 cm) in height.

**RATE:** 1.01 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** 80° flat fan directed 45° forward.

**TANK MIXES:**

- Herbicides: Hoe-Grass 284 at the increased rate of 1.13 L/acre may be tank mixed with 0.405 L/acre Pardner. This mixture will not control wild mustard beyond the 3 leaf stage. Hoe-Grass 284 at the rate of 1.01 to 1.13 L/acre may be tank mixed with Refine at 0.008 kg/acre. Do not add surfactant. Note: This tank mix will only control wild oats and Refine-labelled broadleaf weeds. Refer to Refine label for detailed tank mixing instructions. Allow at least 4 days after the application of Hoe-Grass 284 before applying any other herbicide.
- Fertilizer: None
- Insecticides: Decis

**RESTRICTIONS:**

- Preharvest: Do not apply within 60 days of harvest.
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or harvest for livestock feed prior to crop maturity.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze. Shake well before using.

**ENVIRONMENTAL PRECAUTIONS:** Application under hot (above 27° C) or droughty conditions will result in reduced weed control.

**COMMENTS:** Do not tank mix Hoe-Grass 284 with Pardner or Refine under dry weather conditions or on days when day time temperatures are forecast to exceed 27°C. Under those conditions reduced weed control can be expected. Hoe-Grass provides optimum results under cool, moist conditions and should be applied when the majority of grassy weeds are in the 2 to 3 leaf stage for best results.

## *HOE-GRASS II (310 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: No leaf stage restrictions but do not apply within 60 days of harvest.

b) Weed Stage: Wild oats, foxtail and barnyard grass 1 to 4 leaf stage and before tillering; Persian darnel 1 to 3 leaf stage; volunteer corn 6 to 10 inches (15 to 25 cm) tall; wild mustard up to 3 leaf stage; Russian thistle up to 2 inches (5 cm) in height, and other broadleaf weeds up to the early 4 leaf stage.

**RATE:** 1.42 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** 80° flat fan directed 45° forward.

**TANK MIXES:**

- Herbicides: Hoe-Grass II at a rate of 1.42 L/acre may be tank mixed with MCPA amine (500 g/L) at the reduced rate of 0.028 L/acre to improve wild mustard control. **Caution: Exceeding the recommended rate of MCPA amine 500 will result in a severe reduction in grassy weed control.** Application of the Hoe-Grass II plus MCPA amine mixture should be avoided under hot, dry conditions as severe reductions in grassy weed control will result. Strong crop competition is required for satisfactory weed control with this tank mix. Allow at least

4 days after application of Hoe-Grass II before applying any other herbicide.
- Fertilizer: None
- Insecticides: Decis

**RESTRICTIONS:**
- Preharvest: Do not apply within 60 days of harvest.
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or harvest for forage prior to crop maturity.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze. Shake well before use.

**ENVIRONMENTAL PRECAUTIONS:** Application under hot (above 27° C) or dry conditions will result in reduced weed control.

**COMMENTS:** Because this is a contact herbicide thorough spray coverage is essential. Best results are obtained from early applications (2 to 3 leaf stage of grassy and broadleaf weeds). Moderate day time temperatures (18° to 24° C) and good moisture conditions provide optimum results.

## *KIL-MOR (485 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: 2 to 3 leaf stage.
b) Weed Stage: 2 to 3 leaf stage, cleavers in first to second whorl stage.

**RATES:** 0.344 to 0.445 L/acre. Use the higher rate for heavy weed infestations and for cleavers control.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXTURES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 6 hours will reduce control.
- Grazing: Do not graze or feed treated crop to livestock until 7 days after application.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Do not apply when temperature exceeds 27° C and relative humidity is high.

**COMMENTS:** Application after the 3 leaf stage of the crop will cause crop injury including head and stem deformities. Application under hot, dry conditions or at low water volumes can cause crop injury.

## *LASER (252 g/L)*

**Caution: For use on hard red spring wheat only.**

**APPLICATION TIMING:**
a) Crop Stage: 2 leaf to early flag leaf.
b) Weed Stage: green and yellow foxtail 1 to 4 leaf (do not apply if total leaf number, including tillers, exceeds six), broadleaf weeds 2 to 4 leaf stage.

**RATE:** 1.01 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** 80° or 110° flat flan

**TANK MIXTURES:**
- Herbicides: None
- Fertilizers: None
- Insecticides: None

**RESTRICTIONS:**
- Preharvest: 60 days
- Rainfall: Within 3 hours will reduce control.
- Grazing: Do not graze treated fields prior to harvest.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENT PRECAUTIONS:** Application under hot (above 28° C) or droughty conditions will result in reduced weed control. Under these conditions yellow blotches may appear on crop leaves.

**COMMENTS:** Do not apply to durum wheat or to wheat underseeded to forages. Do not apply by air.

## *LEXONE DF (75%), LEXONE L (480 g/L), SENCOR 500 (500 g/L), SENCOR 75 DF (75%)*

**APPLICATION TIMING:**
a) Crop Stage: 2 to 5 leaf stage.
b) Weed Stage: Young, actively growing weeds less than 2 inches (5 cm) in height or diameter.

**RATE:** Lexone DF – 0.109 kg/acre
Lexone L – 0.172 L/acre
Sencor 500 – 0.172 L/acre
Sencor 75 DF – 0.111 kg/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan. Use 50-mesh line strainer and screens.

**TANK MIXTURES:**
- Herbicides: Lexone L, Lexone DF or Sencor 500 may be tank mixed with 0.34 to 0.453 L/acre MCPA amine (500 g/L) or Sencor 75 DF may be tank mixed with 0.34 to 0.453 L/acre 2,4-D amine (500 g/L) for suppression of top growth of Canada thistle and

other 2,4-D or MCPA susceptible weeds. Apply these mixtures at 3 to 4 leaf stage of crop. For product volumes of other MCPA amine or 2,4-D amine formulations *see Table 21.*

Lexone or Sencor at the low rate may be tank mixed with 0.093 L/acre Banvel to provide control of wild buckwheat and top growth suppression of Canada thistle. Apply when wheat is in the 2 to 3 leaf stage. Allow at least 5 days between application of Lexone or Sencor and wild oat herbicides.

- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Preharvest: Do not apply within 60 days of harvest.
- Rainfall: Within 6 hours will reduce control.
- Grazing: Do not graze or feed to livestock within 30 days of application.
- Recropping: Sensitive crops may be injured the year following application. *See Table 24* for a listing of susceptible crops.
- Storage: Lexone DF, Sencor DF — cool dry place. Lexone L, Sencor 500 — Do not freeze. Ensure material has been thoroughly resuspended by vigorous agitation prior to use.

**ENVIRONMENTAL PRECAUTIONS:** Temporary (7 to 10 days) lightening in crop color and a reduction in crop height may be observed, especially if frost or abnormally high temperatures occur within 1 or 2 days after application. If frost occurs, allow a five day interval for crop to recover before applying Sencor or Lexone.

**COMMENTS:** To avoid crop injury, wheat must be planted at least 2 inches (5 cm) below the soil surface.

## *LOROX see AFOLAN*

## *MATAVEN L (52.5 g/L)*

**Caution: Use only on wheat varieties recommended for production in Manitoba (see 1990 Field Crop Variety Recommendations).**

**APPLICATION TIMING:**
a) Crop Stage: 1 to 6 leaf stage.
b) Weed Stage: 3 to 6 leaf stage.

**RATE:** 2.02 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 300 kPa (45 psi)

**NOZZLES:** Flat fan directed 45° forward. Use 50-mesh screens and filters.

**TANK MIXES:**
- Herbicides: None
- Fertilizers: None
- Insecticides: None

To avoid reduced control of wild oats an interval of 4 days is required between Mataven and Buctril M, MCPA, Pardner applications. An interval of 7 days is required between Mataven and other broadleaf herbicides (example, Banvel, DyVel or 2,4-D).

**RESTRICTIONS:**
- Rainfall: Within 2 hours of application will reduce control.
- Grazing: Do not graze or harvest for forage in the year of treatment.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**COMMENTS:** When wild oat infestations are heavy, treatment at the early stage (3 to 4 leaf) will maximize crop yields by reducing competition. Later treatments, when wild oats are more mature (4 to 6 leaf), will provide more complete control of late emerging wild oats. Wild oats at 2 leaf stage and younger will escape control and grow to maturity.

Agitation will be required to re-emulsify spray if allowed to stand for several hours.

## *MCPA AMINE, SODIUM SALT, SODIUM-POTASSIUM SALT MIXTURES OR ESTERS*

**APPLICATION TIMING:**
a) Crop Stage: 3 leaf to early shot blade.
b) Weed Stage: Actively growing weed seedlings in the 2 to 4 leaf stage.

**RATE:** 0.51 to 0.69 L/acre of 500 g/L formulations. Use the higher rates under dry or cool weather conditions or with heavy weed infestations. For product volumes of other MCPA formulations *refer to Table 21.*

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**
- Herbicides: MCPA amine — Afolan F, Banvel, Buctril M, Lexone, Lorox L, Pardner, Refine.
  MCPA ester — Assert 300 LC, Avenge, Avenge + Pardner.
  MCPAK — Banvel, Buctril M, Pardner.
  MCPA Sodium Salt — Buctril M.
  Not all brands are labelled for tank mixing so check product label prior to use. Follow all precautions and restrictions on both product labels.
- Fertilizers: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 2 hours of application of esters, 4 hours of amines or 6 hours of sodium or potassium salts will reduce control.

- Grazing: Do not graze cattle or cut for feed within 7 days after spraying.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze amine or salt formulations. Esters may be frozen but must be warmed to room temperature and agitated prior to use.

**ENVIRONMENTAL PRECAUTIONS:** Do not spray when air temperature is above 27° C. Extremely hard water may reduce performance or cause problems in spraying the product.

**COMMENTS:** If only wild mustard, lamb's quarters and spring seedlings of stinkweed or flixweed are present, the rate of MCPA (500 g/L) can be reduced to 0.34 L/acre.

## *MCPAK (400 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: 3 to 6 leaf stage.
b) Weed Stage: 1 to 4 leaf stage.

**RATE:** 0.85 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**
- Herbicides: MCPAK at 0.405 L/acre with Banvel at 0.093 L/acre
  MCPAK at 0.55 L/acre with Pardner
  MCPAK at 0.28 L/acre with Buctril M
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 6 hours of application will reduce control.
- Grazing: Do not graze dairy cattle within 7 days after application.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Do not spray when air temperature is above 27° C. Extremely hard water may reduce performance or cause problems in spraying the product.

**COMMENTS:** Early application to hemp nettle (prior to the full 4 leaf stage) is essential.

## *PARDNER (280 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: 2 leaf to early flag leaf, but prior to crop shielding weeds.
b) Weed Stage: 2 to 4 leaf stage. Russian thistle up to 2 inches (5 cm) tall. Wild mustard 1 to 3 leaf stage.

**RATE:** 0.405 to 0.485 L/acre. Use the higher rate for heavier weed infestations or under cool growing conditions.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**
- Herbicides: MCPA, 2,4-D, Hoe-Grass, Avenge
  Do not use 2,4-D mixtures before the 4 leaf stage of crop. When tank mixing observe all use instructions and precautions on both product labels.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or cut treated crop for forage.
- Recropping: No restrictions the year after application.
- Storage: Does not require heated storage.

**COMMENTS:** This contact herbicide requires thorough spray coverage for satisfactory results. Weeds beyond the 4 leaf stage will outgrow the effect of the herbicide. Under prolonged cool growing conditions control will be reduced.

## *REFINE (75%)*

**APPLICATION TIMING:**
a) Crop Stage: 2 leaf to shot blade
b) Weed Stage: Less than 4 inches (10 cm) tall or across. For chickweed apply in the 1 to 6 leaf stage before the crop shields the weeds. For wild buckwheat apply in the 1 to 3 leaf stage.

**RATE:** 0.008 kg/acre

**ADDITIVES:** Add Agsurf, Agral 90, or Citowett Plus at 2 L per 1000 L spray solution.

**WATER VOLUME:** 45 L/acre with flat fan nozzles. When using flood jet or "Raindrop" nozzles, apply 90 L/acre total spray volume.

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles with 50 mesh or larger screens and filters, provide the best spray pattern.

**MIXING:** Add the proper amount of Refine into the necessary volume of water in the spray tank with agitator running. Continuous agitation is required for a uniform suspension and application. Add the surfactant (Agsurf, Agral 90, or Citowett Plus) as the last ingredient. Antifoaming agent such as Halt may be required.

**TANK MIXES:**

- Herbicides: Refine may be tank mixed with MCPA amine (500 g/L) at 0.405 L/acre plus recommended surfactant. For product volumes of other MCPA amine formulations refer to *Table 21*.
  Refine may be tank mixed with Hoe-Grass 284. Use Refine at 0.008 kg/acre plus Hoe-Grass 284 at 1.01 to 1.13 L/acre. Do not add surfactant. Note: This tank mix will only control wild oats and Refine-labelled broadleaf weeds. Refer to Refine label for detailed tank mixing instructions.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: Within 8 hours will reduce control.
- Grazing: Must not be grazed or fed to livestock within 7 days of application.
- Recropping: No restrictions the year after application.
- Storage: Store in a cool dry place.

**ENVIRONMENTAL PRECAUTIONS:** Do not apply to crops stressed by severe weather conditions, frost, low fertility, drought, water saturated soils, disease or insect damage as crop injury may result. Under certain conditions (such as heavy rainfall, prolonged cool weather, frost conditions, wide fluctuations in day/night temperatures) lightening in crop color and a reduction in crop height may occur.

**Caution:** Sulfonyl urea resistant kochia and Russian thistle have developed in Manitoba. Refine will not control these weeds. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.

## *STAMPEDE 360 (360 g/L) + MCPA ESTER OR 2,4-D, STAMPEDE CM (400 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: 2 to 5 leaf.
b) Weed Stage: 1 to 4 leaf when the majority of green foxtail is in the 3 leaf stage and less than 1 inch (2.5 cm) tall. Broadleaf weeds 1 to 4 leaf stage.

**RATES:** Apply Stampede CM alone at 1.11 L/acre or apply 1.11 L/acre Stampede 360 in a tank mix with MCPA ester (500 g/L) at 0.223 L/acre or with 0.324 to 0.486 L/acre 2,4-D LV ester (500 g/L) on spring wheat or with 0.324 L/acre 2,4-D LV ester (500 g/L) on durum wheat or with 0.485 L/acre 2,4-D amine on either spring or durum wheat. Use of 2,4-D mixtures will add control of Russian thistle but may reduce crop tolerance. For product volumes of other MCPA ester or 2,4-D formulations *see Table 21.*

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles and 50-mesh screens.

**MIXING:** Ensure temperature of spray water is not below 10° C. Crystalization of Stampede may occur resulting in an uneven pesticide mixture.
When mixing Stampede 360 add MCPA or 2,4-D first to a half-filled spray tank, then Stampede 360, maintaining agitation during filling. For Stampede CM pour the measured quantity into a partially filled spray tank and while agitation is running add the remaining water. Do not let spray mixture stand without agitation.

**TANK MIXES:**

- Herbicides: Stampede 360 should be applied as a tank mixture with MCPA ester, 2,4-D LV ester or 2,4-D amine.
  Stampede CM – No tank mixes recommended.
  Allow 3 days between application of Stampede and other herbicides. Do not apply Stampede to crops grown in fields in which atrazine or other triazine herbicides (such as Lexone, Sencor, Bladex, Blagal, Marksman, Simadex, Princep, Laddok) have been applied until soil analysis confirms that the triazine residues have completely disappeared.
- Fertilizer: None
- Insecticides: The following insecticides are the only products registered for safe use in the same year that Stampede is applied. Furadan may be used on wheat if applied 5 days or longer after an application of Stampede. For Dimethoate (Cygon) or Malathion, allow 14 days after an application of Stampede. The insecticide Decis may be applied at any time before or after the application of Stampede CM. Crops grown from seed treated with dual purpose (insecticide/fungicide) seed dressings may be treated with Stampede.

**RESTRICTIONS:**

- Rainfall: Within 4 hours will reduce control.
- Grazing: Do not graze or harvest for livestock feed prior to crop maturity.
- Recropping: No restrictions the year after application.
- Storage: Do not store at temperatures below -9° C.

**ENVIRONMENTAL PRECAUTIONS:** Best weed control is obtained when relative humidity is high and daily maximum temperatures exceed 21° C. Under hot, dry and low relative humidity conditions, spray during early morning or evening. Do not apply Stampede when daily temperatures remain below 10° C or when they are expected to exceed 30° C. Crops damaged by high winds should be fully recovered before applying Stampede. Avoid spraying if crop is recovering from frost damage or if frost is expected within 24 hours.

**COMMENTS:** Leaf discoloration and burn may occur on the crop, particularly under hot, dry conditions. Under these conditions, early morning or evening spraying is recommended. Stampede is a contact herbicide and thorough coverage is required for best results. Early application (2 to 3 leaf stage of foxtail) is essential. Stampede will not control foxtail or broadleaf weeds that emerge after application.

Do not leave spray solution in sprayer tank overnight.

Stampede 360 is also registered for application without MCPA or 2,4-D, however the spectrum of broadleaved weeds controlled and effectiveness of green foxtail control will be reduced. Stampede may be applied using "Floater" spray equipment provided 70 L/acre spray volume and flat fan nozzles are used. Application by aircraft or Spra-Coupe is not recommended.

## *TARGET (400 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: 2 to 5 leaf.
b) Weed Stage: 2 to 3 leaf stage. Hemp nettle before second pair of true leaves are formed. Cleavers in the 1 to 2 whorl stage.

**RATE:** 0.405 to 0.61 L/acre
Use the higher rate under adverse weather conditions, when weed density is high or for cleavers control.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan with 50-mesh screens and filters.

**TANK MIXES:**
- Herbicides: For chickweed control Target may be tank mixed with Sencor 500.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 3 hours will reduce control.
- Grazing: Do not graze or harvest for livestock feed until 7 days after application.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**COMMENTS:** Treatment after the 5 leaf stage of the crop will cause crop injury. Do not let spray mixture stand without agitation.

## *TORDON 202 C ([illegible] g/L)*

**APPLICATION TIMING:**
a) Crop Stage: 3 to 5 leaf.
b) Weed Stage: 2 to 4 leaf.

**RATE:** 0.81 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXTURES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 6 hours will reduce control.
- Grazing: Do not permit meat animals being finished for slaughter or dairy animals to forage or graze treated fields within 2 weeks of treatment.
- Recropping: Do not plant fields treated with Tordon 202 C to alfalfa or sunflowers until at least the third growing season after the year of treatment, or beans, lentils, peas or potatoes until at least the fifth growing season after the year of treatment. Fallow or replant to wheat, barley, oats, flax or rapeseed for two years following treatment. *See Table 24* for additional recropping information. Due to the length of recropping restrictions the use of Tordon 202 C in Manitoba is not recommended on farms where vegetable crops, pulse crops or forage legumes are included in the crop rotation.
- Storage: Do not freeze.

**COMMENTS:** Straw from crops treated with Tordon 202 C will contain residues of the herbicide. Although this straw is not toxic to livestock it should not be used for composting or mulching on susceptible broadleaf crops. If straw is used for bedding or animal feed return the manure to fields to be planted to grain crops, flax, rapeseed, or perennial grasses.
Soil from Tordon 202 C treated fields should not be moved to other areas, nor used to grow susceptible broadleaf plants unless an adequate, sensitive bioassay shows that no detectable picloram is present.

## *2,4-D AMINE, LV ESTER*

**APPLICATION TIMING:**
a) Crop Stage: 4 leaf to early shot blade.
b) Weed Stage: 2 to 4 leaf.

**RATE:** 0.51 to 0.69 L/acre of formulations containing 500 g/L 2,4-D. Use the higher rates under dry or cool weather conditions, with heavy weed infestations or for Canada thistle top growth suppression. For product volumes of other 2,4-D formulations *see Table 21*.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**

- Herbicides: 2,4-D amine – Pardner, Banvel, or Sencor.
  2,4-D LV ester – Partner, Avenge, Assert 300 LC.
  When tank mixing observe all use instructions and precautions on each product label.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**

- **Rainfall:** Within 2 hours of ester and 4 hours of amine application will reduce control.
- Grazing: **Do not graze for at least 24 hours after treatment. If tank mixing check label of other product for grazing restrictions.**
- Recropping: **No restrictions the year after application.**
- Storage: **Do not freeze amines. Ester formulations may be frozen but must be warmed to room temperature and thoroughly agitated prior to use.**

**COMMENTS:** If only wild mustard, lamb's quarters and spring seedlings of stinkweed or flixweed are present, the rate of 2,4-D (500 g/L) can be reduced to 0.34 L/acre.

**For wheat underseeded to forage crops see Forage Crops section.**

# *Winter Wheat*

## TABLE 6 SUMMARY OF WINTER WHEAT RECOMMENDATIONS

Note: The ratings in this chart give general comparisons based on rates, timing, and other application instructions and precautions as outlined in this Guide.
Where two or more brand names are indicated, the weed may not appear on all labels. See Field Crops Chart for complete weed spectrum.

| HERBICIDE | Crop Tolerance | Barnyard Grass | Foxtail, Green and Yellow | Wild Oats | Buckwheat, Wild | Catchfly, Night Flowering | Chickweed | Cleavers | Cow Cockle | Cocklebur | Flixweed | Hemp Nettle | Kochia | Lamb's Quarters | Mustard, Wild | Pigweed, Red Root | Russian Thistle | Shepherd's Purse | Smartweed, Annual Species | Stinkweed | Thistle, Sow (Perennial) | Thistle, Canada | Volunteer Corn | Volunteer Flax | Volunteer Mustard, Rapeseed | Volunteer Sunflowers |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Avenge[4] | G | | | G | | | | | | | | | | | | | | | | | | | | | | |
| Banvel + MCPA or 2,4-D | F | | | | G | | | G | G | G | E[1] | | G | E | E | G | G | E[1] | G | E[1] | F[2] | F[2] | | P[6] | G | F |
| Buctril M | E | | | | E | F | | | G | G | G[1] | | G | E | E | G | G | G[1] | G | G[1] | P[2] | P[2] | | | F | F |
| Diphenoprop 600/Estaprop | G | | | | G | | | | | G | E[1] | | G | E | E | G | G | E[1] | G | E[1] | F[2] | F[2] | | P | G | G |
| Glean[1,5] | | | | | ● | | ● | ● | ● | | ●[1] | ● | ● | ● | ● | ● | ● | ●[1] | ● | ●[1] | | ●[2] | | | ● | |
| Hoe-Grass 284 | G | G | G | G | | | | | | | | | | | | | | | | | | | F | | | |
| Hoe-Grass 284 + Refine[8] | G | | | G | G | | G | | E | | | E | F | E | E | E | G | | E | G[1] | | | | | G | |
| Kil-Mor | F | | | | G | | | G | G | G | E[1] | | | E | E | G | G | E[1] | G | E[1] | F[2] | F[2] | | P | | |
| MCPA | E | | | | | | | | | G | E[1] | | | E | E | | | E[1] | | E[1] | P[2] | P[2] | | | | P |
| Pardner | E | | | | G | P | | | G | F | | | F | G | F | F | G | | G | F[1] | | | | | | |
| Pardner + MCPA/2,4-D | E | | | | E | F | | | G | G | G[1] | | G | E | E | G | G | G[1] | G | G[1] | P[2] | P[2] | | | | F |
| Refine[8] | E | | | | G | | G | | E | | | E | F | E | E | E | G | | E | G[1] | | | | | G | |
| Refine[8] + MCPA Amine | E | | | | G | | G | | E | | | E | F | E | E | E | G | | E | G[1] | | P[2] | | | G | |
| Target | F | | | | G | G | | G | G | | E[1] | P | G | E | E | G | G | E[1] | G | E[1] | F[2] | F[2] | | | G | F |
| 2,4-D | G | | | | | | | | | G | E[1] | | | E | E | | G | E[1] | | E[1] | P[2] | P[2] | | P[7] | | |

**LEGEND**

| | Crop Tolerance | Weed Control |
|---|---|---|
| E — Excellent | Consistently exhibits a high degree of tolerance over a wide range of growing conditions. | Consistently provides a high degree of control over a wide range of growing conditions. |
| G — Good | Exhibits acceptable crop tolerance under most growing conditions. | Provides acceptable control under most growing conditions. |
| F — Fair | Tolerance is variable depending on growing conditions. | Control is variable depending on growing conditions. |
| P — Poor | Tolerance is often unacceptable. | May provide some suppression but control is often unacceptable. |

● Labelled for control or suppression.

[1] Spring seedlings only. Overwintered rosettes will not be controlled.

[2] Top growth only, regrowth can be expected.

[4] Check text for varietal restrictions.

[5] Not recommended for use in Manitoba. Will not control sulfonyl urea resistant kochia or Russian thistle.

[6] Use the 2,4-D mix only.

[7] Use 2,4-D LV ester only.

[8] Will not control sulfonyl urea resistant kochia or Russian thistle.

## Postemergence

### *AVENGE 200 C (200 g/L)*

**Caution: Use on Norstar and Sundance varieties only.**

**APPLICATION TIMING:**
a) Crop Stage: 1 to 6 leaf stage.
b) Weed Stage: 3 to 5 leaf stage.

**RATES:** 1.01 to 1.21 L/acre
Use the higher rate if wild oat population is greater than 18 wild oats per square foot (200 wild oats per square meter).

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles directed 45° forward.

**TANK MIXES:**
- Herbicides: Diphenoprop 600, Estaprop, MCPA ester, 2,4-D ester, Buctril M, Pardner
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Avenge and other herbicides or fertilizers.

**RESTRICTIONS:**
- Rainfall: Within 6 hours will reduce control.
- Grazing: Do not graze or harvest for feed within 8 weeks after treatment.
- Recropping: No restrictions the year after application.
- Storage: May be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Do not spray if crop is heavy with dew or rain. Do not apply if the crop is stressed from drought or excessive moisture. Do not spray if freezing temperatures are forecast.

**COMMENTS:** Avenge is most effective under warm, moist conditions. Performance will be poor under dry conditions. Crop injury may occur during hot, humid weather.

## *BANVEL (480 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: Spring application only. When crop is more than 6 inches (15 cm) tall, but before the shot blade stage.

b) Weed Stage: 2 to 3 leaf stage and rosettes less than 2 inches (5 cm) across.

**RATES:** Apply 0.093 to 0.117 L/acre tank mixed with 0.344 L/acre MCPA amine (500 g/L) or 2,4-D amine (500 g/L) or with 0.405 L/acre MCPAK (400 g/L). For product volumes of other MCPA or 2,4-D amine formulations *refer to Table 21*. Use the higher rate under poor growing conditions or for cleavers control.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**
- Herbicides: MCPA amine, 2,4-D amine, MCPAK.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 8 hours will reduce control.
- Grazing: Do not graze or cut for feed prior to crop maturity.
- Recropping: No restrictions the year after application.
- Storage: May be frozen but must be warmed to room temperature and shaken thoroughly before use.

**ENVIRONMENTAL PRECAUTIONS:** Spray when air temperature is 10° to 25° C. Avoid application when crop is under stress from adverse environmental conditions. Do not spray if risk of frost or severe drop in night temperature is forecast.

**COMMENTS:** Late application will cause crop injury including head and stem deformities. Application under hot, dry conditions or at low water volumes can cause crop injury.

## *BUCTRIL M (560 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: Apply Buctril M from the 2 to 4 leaf stage in the fall or apply Buctril M from time growth commences in the spring, until the early shot blade stage.

b) Weed Stage: 2 to 4 leaf stage.

**RATES:** 0.405 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**
- Herbicides: Avenge (Varietal restrictions apply. See Avenge recommendation.)
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or cut for feed.
- Recropping: No restrictions the year after application.
- Storage: Does not require heated storage.

**ENVIRONMENTAL PRECAUTIONS:** Avoid spraying during drought. Under conditions of high temperature and humidity, discoloration of cereals may occur.

**COMMENTS:** Because this is a contact herbicide poor results will occur if there is poor spray coverage. Weeds beyond the 4 leaf stage may outgrow the effects of the herbicide. Top growth of Canada thistle will be burnt off but there will be little effect on the root, so rapid regrowth can be expected. Prolonged cool weather conditions may result in reduced weed control.

## *DIPHENOPROP 600 (562 g/L), ESTAPROP (562 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: Spring application only, after full tillering but before the shot blade stage.

b) Weed Stage: 2 to 4 leaf stage.

**RATE:** 0.71 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXTURES:**
- Herbicides: Avenge (Varietal restrictions apply. See Avenge recommendations.)
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 8 hours of application will reduce control.
- Grazing: Do not graze or cut for feed within 28 days of treatment.
- Recropping: No restrictions the year after application.
- Storage: May be frozen. Shake well prior to use.

**ENVIRONMENTAL PRECAUTIONS:** Crops under stress from adverse environmental conditions such as excess moisture, drought or disease, may be injured by Estaprop or Diphenoprop 600.

**COMMENTS:** Early application results in crop injury. Dry conditions will reduce control.

## DYVEL ([illegible] g/L)

**APPLICATION TIMING:**
a) Crop Stage: Spring application only; when crop is 6 to 10 inches (15 to 25 cm) tall but before the shot blade stage.
b) Weed Stage: 2 to 3 leaf stage and rosettes less than 2 inches (5 cm) in diameter.

**RATE:** 0.51 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 8 hours after application will reduce control.
- Grazing: Do not graze or harvest for livestock feed prior to crop maturity.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Do not apply if frost is forecast. Avoid application if crop is under stress from disease or adverse environmental conditions. Best results when applied under good growing conditions and air temperatures are 10° to 25° C.

**COMMENTS:** Crop damage can occur from late applications. Use of lower than recommended water volumes or applications under hot, dry conditions can result in crop injury.

## GLEAN (75%)

**Caution:** Although Glean is registered for broadleaf weed control in winter wheat, **use of Glean is not recommended in Manitoba.** Recropping restrictions for Glean will severely limit cropping opportunities on fields where it has been used. If you are considering using this product be sure to read the pH restrictions and recropping intervals outlined in this Guide and on the product label. Crops not listed in the Glean crop rotation guidelines are very sensitive to low concentrations of Glean in the soil. Do not use Glean on soils with a pH above 7.5. Detailed soil tests of your field will be required to accurately determine pH for your field. *Refer to the Soil pH section* of this Guide for additional information on pH levels and their measurement.

**APPLICATION TIMING:**
a) Crop Stage: 2 leaf to flag leaf stage.
b) Weed Stage: Best results when applied to small (less than 4 inch (10 cm) tall) actively growing weeds. Wild buckwheat should be in the 1 to 3 leaf stage, cleavers 1 to 2 inches (2.5 to 5 cm) tall. Canada thistle can be sprayed up to the bud stage for seasonal control.

**RATE:** 0.006 kg/acre – cow cockle, flixweed, green smartweed, hemp nettle, lady's thumb, lamb's quarters, red root pigweed, shepherd's purse, stinkweed, stork's bill, volunteer rapeseed and wild mustard.
0.009 kg/acre – bluebur, common groundsel, corn spurry and scentless chamomile.
0.012 kg/acre – Canada thistle, cleavers, common chickweed, kochia, Russian thistle and wild buckwheat.

**ADDITIVES:** Add Agsurf, Agral 90, Citowett Plus, Super Spreader-Sticker or Triton XR at a rate of 1 L per 1000 L spray solution. Use of a defoaming agent such as Halt may be required.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles with 50-mesh screens. Use only metal or nylon filters.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Heavy rainfall immediately after application may cause crop lightening but will not affect weed control.
- Grazing: May be grazed by or fed to livestock any time after treatment.
- Recropping: Most rotational crops will be injured by Glean residues in the soil. *See recropping guidelines in Table 24.*
- Storage: Store in a cool dry place.

**ENVIRONMENTAL PRECAUTIONS:** Weed control will be reduced under dry weather conditions. Crop stress from severe weather conditions, drought, water saturated soil, disease, or insect damage, before or after Glean application may predispose the crop to Glean injury.

**COMMENTS:** Use of rates lower than those recommended does not reduce recropping restrictions. Due to pH variability of soils and the influence of environmental conditions on Glean degradation in the soil, effects of this herbicide on rotational crops cannot be accurately predicted, and recropping options are severely restricted. Extremely low rates of Glean will injure sensitive crops so spraying equipment must be thoroughly cleaned using chlorine bleach to deactivate any traces left in the spray tank, lines, or booms. Do not use on winter wheat underseeded to legumes or grasses as severe injury to these forages will result. See the product label for additional use restrictions.

## Winter Wheat

**Caution:** Sulfonyl urea resistant kochia and Russian thistle have developed in Manitoba. Glean will not control these weeds. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.

### *HOE-GRASS 284 (284 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: Spring application only. No leaf stage restrictions but do not apply within 60 days of harvest.

b) Weed Stage: Wild oats, foxtail and barnyard grass 1 to 4 leaf stage and before tillering; Persian darnel 1 to 3 leaf stage; volunteer corn 6 to 10 inches (15 to 25 cm) in height.

**RATE:** 1.01 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** 80° flat fan directed 45° forward.

**TANK MIXES:**

- Herbicides: Hoe-Grass 284 at the rate of 1.01 to 1.13 L/acre may be tank mixed with Refine at 0.008 kg/acre. Do not add surfactant. Note: This tank mix will only control wild oats and Refine labelled broadleaf weeds. Refer to Refine label for detailed tank mixing instructions.
- Fertilizer: None
- Insecticides: Decis

**RESTRICTIONS:**

- Preharvest: Do not apply within 60 days of harvest.
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or harvest for livestock feed prior to crop maturity.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze. Shake well before using.

**ENVIRONMENTAL PRECAUTIONS:** Application under hot (above 27° C) or droughty conditions will result in reduced weed control.

**COMMENTS:** Under dry weather conditions or on days when day time temperatures are forecast to exceed 27° C, reduced weed control can be expected. Hoe-Grass provides optimum results under cool, moist conditions and should be applied when the majority of grassy weeds are in the 2 to 3 leaf stage for best results.

### [illegible]

**APPLICATION TIMING:**

a) Crop Stage: Spring application only. Apply before the crop is more than 12 inches (30 cm) high (top leaf extended).

b) Weed Stage: 2 to 3 leaf stage, cleavers in first to second whorl stage.

**RATE:** 0.344 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXTURES:**

- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: Within 6 hours will reduce control.
- Grazing: Do not graze or feed treated crop to livestock until 7 days after application.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Do not apply when temperature exceeds 27° C and relative humidity is high.

**COMMENTS:** Ensure that proper rate, water volume and timing are used or crop injury will result.

### *MCPA AMINE, SODIUM SALT, SODIUM POTASSIUM SALT MIXTURES OR ESTERS*

**APPLICATION TIMING:**

a) Crop Stage: Spring application only. Apply from the time winter wheat commences growth until the early shot blade stage.

b) Weed Stage: Actively growing weed seedlings (2 to 4 leaf stage).

**RATE:** 0.51 to 0.69 L/acre of 500 g/L formulations. Use the higher rates under dry or cool weather conditions or with heavy weed infestations. For product volumes of other MCPA formulations *refer to Table 21*.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**

- Herbicides: MCPA amine – Pardner, Refine
  MCPA ester – Avenge
  MCPAK – Pardner
  MCPA Sodium Salt – None
  Not all brands are labelled for tank mixing so check product label prior to use. Follow all precautions and restrictions on both product labels.

- Fertilizer: Some formulations can be mixed with liquid fertilizer (28-0-0). Conduct a compatability test before mixing. Check product labels for registered brands.
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 2 hours of application of esters, 4 hours of amines and 6 hours of sodium or potassium salts will reduce control.
- Grazing: Do not graze cattle or cut for feed within 7 days after spraying.
- Recropping: No restrictions.
- Storage: Do not freeze amine or salt formulations. Esters may be frozen but must be warmed and agitated prior to use.

**ENVIRONMENTAL PRECAUTIONS:** Do not spray when air temperature is above 27° C. Extremely hard water may reduce performance or cause problems in spraying the product.

**COMMENTS:** If only wild mustard, lamb's quarters and spring seedlings of stinkweed or flixweed are present, the rate of MCPA (500 g/L) can be reduced to 0.34 L/acre.

### *PARDNER (280 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: Spring application only. Apply up to the early shot blade but prior to crop shielding weeds.

b) Weed Stage: 2 to 4 leaf stage except Russian thistle up to 2 inches (5 cm) tall and wild mustard 1 to 3 leaf stage.

**RATE:** 0.405 to 0.485 L/acre
Use the higher rate for heavier weed infestations or under cool growing conditions.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXTURES:**
- Herbicides: MCPA, 2,4-D, Avenge
  Do not use 2,4-D mixtures before the 4 leaf stage of crop.
  Follow all precautions and restrictions on both product labels when tank mixing.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or cut treated crop for forage.
- Recropping: No restrictions the year after application.
- Storage: Does not require heated storage.

**COMMENTS:** This contact herbicide requires thorough spray coverage for satisfactory results. Weeds beyond the 4 leaf stage will outgrow the effect of the herbicide.

### *REFINE (75%)*

**APPLICATION TIMING:**

a) Crop Stage: In the spring when the crop is in the 2 leaf to flag leaf.

b) Weed Stage: Less than 4 inches (10 cm) tall or across. For chickweed apply in the 1 to 6 leaf stage before the crop shields the weeds. For wild buckwheat, apply in the 1 to 3 leaf stage.

**RATE:** 0.008 kg/acre

**ADDITIVES:** Add Agsurf, Agral 90, or Citowett Plus at 2 L per 1000 L spray solution.

**WATER VOLUME:** 45 L/acre with flat fan nozzles. When using floodjet or "Raindrop" nozzles apply 90 L/acre total spray solution.

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles with 50 mesh or larger screens and filters, provide the best spray pattern.

**MIXING:** Add the proper amount of Refine into the necessary volume of water in the spray tank with agitator running. Continuous agitation is required for a uniform suspension and application. Add the surfactant (Agsurf, Agral 90 or Citowett Plus) as the last ingredient. Antifoaming agent such as Halt may be required.

**TANK MIXES:**
- Herbicides: Refine may be tank mixed with MCPA amine (500 g/L) at 0.405 L/acre plus recommended surfactant. For product volumes of other MCPA amine formulations see *Table 21*. Refine may be tank mixed with Hoe-Grass 284. Use Refine at 0.008 kg/acre plus Hoe-Grass 284 at 1.01 to 1.13 L/acre. Do not add surfactant. Note: This tank mix will only control wild oats and Refine-labelled broadleaf weeds. Refer to the Refine label for detailed tank mixing instructions.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 8 hours will reduce control.
- Grazing: Must not be grazed or fed to livestock within 7 days of application.
- Recropping: No restrictions the year after application.
- Storage: Store in a cool dry place.

**ENVIRONMENTAL PRECAUTIONS:** Do not apply to crops stressed by severe weather conditions, frost, low fertility, drought, water saturated soils, disease or insect damage as crop injury may result. Under certain conditions (such as heavy rainfall, prolonged cool weather, frost conditions, wide fluctuations in day/night temperatures) lightening in crop color and a reduction in crop height may occur.

## Winter Wheat

**Caution:** Sulfonyl urea resistant kochia and Russian thistle have developed in Manitoba. Refine will not control these weeds. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.

### *TARGET (400 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: Spring application only. Before the crop is more than 12 inches (30 cm) high (top leaf extended).

b) Weed Stage: 2 to 3 leaf stage. Hemp nettle before second pair of true leaves are formed. Cleavers in the 1 to 2 whorl stage.

**RATE:** 0.405 to 0.61 L/acre
Use the higher rate under adverse weather conditions, when weed density is high or for cleavers control.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**

- Herbicides: None
- Fertilizer: For control of winter annual weeds Target may be applied in the spring with 28-0-0 liquid nitrogen fertilizer (minimum 45 L/acre) instead of water. Under rapid growing conditions and hot temperatures this mixture can cause leaf burning. Conduct a compatability test before mixing.
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: Within 3 hours will reduce control.
- Grazing: Do not graze or harvest for livestock feed until 7 days after application.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**COMMENTS:** Treatment at other than recommended crop stage will cause injury. Do not let spray mixture stand for long periods of time without agitation.

### 2,4-D AMINE, LV ESTER

**APPLICATION TIMING:**

a) Crop Stage: Spring application only after winter wheat is fully tillered but before the early shot blade stage.

b) Weed Stage: 2 to 4 leaf.

**RATE:** 0.51 to 0.69 L/acre of formulations containing 500 g/L 2,4-D. Use the higher rates under dry or cool weather conditions, with heavy weed infestations or for Canada thistle top growth suppression. For product volumes of other 2,4-D formulations *see Table 21.*

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**

- Herbicides: 2,4-D amine – Pardner
  2,4-D LV ester – Pardner, Avenge
  When tank mixing follow all precautions and restrictions on both product labels.
- Fertilizer: Some formulations can be mixed with liquid fertilizer (28-0-0). Conduct a compatability test before mixing. See product labels for registered brands.
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: Within 2 hours of esters or 4 hours of amines will reduce control.
- Grazing: Do not graze for at least 24 hours after treatment. If tank mixing check label of other product for grazing restrictions.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze amine formulations. Ester formulations may be frozen but must be warmed to room temperature and thoroughly agitated prior to use.

**COMMENTS:** If only wild mustard, lamb's quarters and spring seedlings of stinkweed or flixweed are present, the rate of 2,4-D (500 g/L) can be reduced to 0.34 L/acre.

**For winter wheat underseeded to forage crops see Forage Crops section.**

# Other Field Crops

## Beans, Dry

To provide broad spectrum weed control it is generally necessary to use a preplant incorporated herbicide plus a preemergence or postemergence herbicide.

### Preplant Incorporated

Manitoba Agriculture does not recommend fall application of soil incorporated herbicides to soils which are subject to wind or water erosion. Fall application to summerfallow fields or to soils with light trash cover or to light textured soils may predispose the field to erosion by wind and water and is not recommended.

### *EDGE DF (50%), EDGE GRANULAR (5%)*

**WEEDS CONTROLLED:** *See Field Crops Chart.*

**Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Edge will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:**
a) Crop Stage: preplant incorporated
b) Weed Stage: pre-emergence

**RATES:**

| Product | SOIL TYPE | | | |
|---|---|---|---|---|
| | Light Textured Soils 2 - 6% Organic Matter | MEDIUM TO HEAVY TEXTURED SOILS | | |
| | | 2 - 4% Organic Matter | 4 - 6% Organic Matter | 6 - 15% Organic Matter |
| Spring Edge DF | 0.69 kg/acre | 0.69 kg/acre | 0.89 kg/acre | 1.13 kg/acre |
| Fall Edge Granular | Not Recommended* | 8.9 kg/acre | 11.3 kg/acre | 11.3 kg/acre |
| Spring Edge Granular | 6.9 kg/acre | 6.9 kg/acre | 11.3 kg/acre | 11.3 kg/acre |

* The two fall incorporations required will leave light soils vulnerable to wind or water erosion. This use is not recommended.

Although Edge DF is registered for use in the fall, this use is not recommended as incorporation requirements may predispose fields to erosion.

**APPLICATION:** Edge Granular – granular applicator
Edge DF – sprayer equipped with jet or perforated pipe agitation. (Return line agitation is not sufficient.)

**WATER VOLUME:** 45 L/acre (Edge DF only)

**PRESSURE:** 275 kPa (40 psi) (Edge DF only)

**NOZZLES:** Flat fan equipped with 50-mesh or coarser nozzle screens.
(Edge DF only)

**MIXING:** When using Edge DF, fill the tank half full with water and begin agitation. Slowly add half the required amount of Edge DF. Continue filling the tank with water, gradually adding the remaining amount of Edge DF. Continue vigorous agitation at all times. Avoid adding Edge DF over the sump opening as filter plugging may occur.

**INCORPORATION:** Two incorporations required at right angles for thorough mixing. The first incorporation must be completed within 24 hours of spraying. When using Edge DF, the second incorporation may be done immediately after the first. When using the granular formulation, delay the second incorporation for 3 days after the first. If applying Edge granular in the fall, both incorporations must be done in the fall to obtain satisfactory results. See *Herbicide Information* section for additional details on incorporation.

**TANK MIXES:**
- Herbicides: None
- Fertilizers: Edge DF may be tank mixed with liquid fertilizer. Conduct a compatibility test before mixing. Edge DF may also be impregnated onto dry bulk fertilizers. See *Herbicide Information* section for details on mixing and spreading.
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: No effect once incorporated.
- Grazing: Do not graze or harvest as forage prior to crop maturity.
- Recropping: Soil residues may affect subsequent crops. See *Table 24* for a list of susceptible crops.
- Storage: Store in a dry, cool place. May be frozen. Do not expose to prolonged heat or prolonged direct sunlight.

**ENVIRONMENTAL PRECAUTIONS:** Poor results can be expected if dry soil conditions prevail between application time and weed emergence.

**COMMENTS:** When using the fall-applied granular formulation, shallow spring tillage (separate from seedbed preparation and prior to seeding) is required to destroy existing weed growth and to warm the soil to activate the herbicide.

### *EPTAM 8-E (800 g/L)*

**WEEDS CONTROLLED:** *See Field Crops Chart.*

**APPLICATION TIMING:**

a) Crop Stage: preplant incorporated (spring only).
b) Weed Stage: preemergence.

**RATES:** 1.72 to 2.23 L/acre
Use the higher rate for quackgrass suppression.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 200 kPa (30 psi)

**NOZZLES:** Flat fan.

**INCORPORATION:** Incorporate immediately (within minutes) of application. Incorporate twice at right angles. *See Herbicide Information section* for additional details.

**TANK MIXES:**

- Herbicides: None
- Fertilizer: May be mixed with liquid fertilizer (conduct a compatability test before mixing) or impregnated onto dry bulk fertilizer (except ammonium nitrate). *See Herbicide Information section* for mixing and application instructions.
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: Do not apply to a wet soil surface.
- Grazing: Do not graze or harvest as forage prior to crop maturity.
- Recropping: No restrictions the year after application.
- Storage: May be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Apply to a dry soil surface only. To minimize crop injury, delay seeding 10 days if cold, wet soils, drought or excessive heat prevail at time of application.

**COMMENTS:** Immediate, thorough incorporation is essential for satisfactory results. Very cold or dry soil conditions will reduce control. Quackgrass rhizomes must be thoroughly fragmented (3 nodes or less) prior to application. Inter-row tillage may be required to control later germinating weeds.

## *RIVAL (500 g/L), RIVAL 10 G (10%), TREFLAN EC (545 g/L), TREFLAN QR 5 (5%), TRIFLUREX (400 g/L)*

**WEEDS CONTROLLED:** *See Field Crops Chart.*

**Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Rival, Treflan or Triflurex will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:**

a) Crop Stage: preplant incorporated.
b) Weed Stage: preemergence.

**RATES:**

*Spring Applications*

| HERBICIDE | SOIL TYPE | |
|---|---|---|
| | **Light soils with less than 6% organic matter** | **Medium to heavy soils with 6–15% organic matter** |
| Rival | 0.65 L/acre | 0.9 - 1.1 L/acre |
| Rival 10 G | 3.4 kg/acre | 4.45 - 5.7 kg/acre |
| Treflan EC | 0.61 L/acre | 0.81 - 1.05 L/acre |
| Treflan QR 5 | 6.9 kg/acre | 8.9 - 11.3 kg/acre |
| Triflurex | 0.81 L/acre | 1.1 L/acre |

*Fall Applications (September 1 to freeze-up).*

| HERBICIDE | SOIL TYPE | |
|---|---|---|
| | **Light soils with less than 6% organic matter** | **Medium to heavy soils with 6–15% organic matter** |
| Rival 10 G | 4.45 kg/acre* | 5.7 - 6.9 kg/acre |
| Treflan QR 5 | 8.9 kg/acre* | 11.3 - 13.8 kg/acre |

*Application to light textured soils in the fall may predispose fields to wind and water erosion.

The granular formulation is better suited to fall application, the liquid to spring application. Although liquid formulations are registered for fall application this use is not recommended as incorporation requirements may predispose fields to erosion.

**APPLICATION:** Liquid – field sprayer
Granular – granular applicator

**WATER VOLUME:** 45 L/acre (liquid product only)

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**INCORPORATION:** Two incorporations required at right angles for thorough mixing. The first incorporation must be completed within 24 hours of spraying. The second incorporation for the liquid may be done immediately after the first. When using the granular delay the second incorporation for 3 days after the first. With fall applications the second incorporation may be delayed until the spring. *See the Herbicide Incorporation Section* for detailed incorporation instructions.

**TANK MIXES:**

- Herbicides: None
- Fertilizer: May be applied with liquid fertilizer (eg. 28-0-0) as a carrier. Conduct a compatibility test before mixing. Rival EC or Treflan EC may be impregnated onto dry bulk fertilizer. See *Herbicide Information* section for details.
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: No effect once incorporated.
- Grazing: Do not graze or harvest for livestock feed in the year of treatment.
- Recropping: Rival, Treflan and Triflurex leave a residue in the soil which may affect subsequent crops. *See Table 24* for a list of susceptible crops.

- Storage: Do not freeze liquid products. If stored below 5° C bring contents to 15° C for 24 hours and shake well before using. Store granular products in a cool dry place.

**ENVIRONMENTAL PRECAUTIONS:** Poor results will occur if dry conditions prevail between application time and weed emergence.

**COMMENTS:** A shallow spring tillage separate from seedbed preparation prior to seeding is required to destroy existing weed growth and to warm the soil to activate the herbicide.

## Postemergence

### *BASAGRAN (480 g/L)*

**WEEDS CONTROLLED:** *See rate table below.*

**APPLICATION TIMING:**

a) Crop Stage: after the first trifoliolate leaf stage.
b) Weed Stage: apply when weeds are at the height recommended in the rate table below.

**RATES:**

| Weeds | Rate of Basagran when weeds listed below are within the recommended treatment height | | | |
|---|---|---|---|---|
| | 0.71 L/acre inches | (cm) | 0.91 L/acre inches | (cm) |
| **Annual Weeds** | | | | |
| Black nightshade | | | 0.2 – 0.7 | (0.5 – 1.8) |
| Cocklebur | 3 – 7 | (7.5 – 17.5) | 7 – 12 | (17.8 – 30.5) |
| Common chickweed | apply 1 to 3 weeks after chickweed emergence | | | |
| Common groundsel | | | 2 – 4 | ( 5.0 – 10.0) |
| Common ragweed | | | 1 – 2 | ( 2.5 – 5.0) |
| Corn spurry | | | 1 – 4 | ( 2.5 – 10.0) |
| Hairy galinsoga | | | 2 – 3 | ( 5.0 – 7.5) |
| Lady's thumb | 1 – 3 | ( 2.5 – 7.5) | 3 – 8 | ( 7.5 – 20.0) |
| Lamb's quarters | | | 0.5 – 1.0 | ( 1.3 – 2.5) |
| Purslane | | | 1 – 2 | ( 2.5 – 5.0) |
| Red root pigweed | | | 0.5 – 1.25 | ( 1.3 – 3.2) |
| Russian thistle | | | 1 – 3 | ( 2.5 – 7.5) |
| Venice mallow | 1 – 2 | ( 2.5 – 5.0) | 2 – 4 | ( 5.0 – 10.0) |
| Wild mustard | 1 – 5 | ( 2.5 – 12.5) | 5 – 10 | (12.5 – 25.0) |
| **Perennial Weeds** | – repeat application 7 to 10 days after first application | | | |
| Canada thistle | 6 – 8 | (15 – 20 ) | more than 8 | (more than 20) |
| Yellow nutsedge | 6 – 8 | (15 – 20 ) | more than 8 | (more than 20) |

**ADDITIVES:** Add Assist at 0.5 to 1.0 L per 100 L spray mixture. If hot, humid conditions prevail (above 28° C and 80% relative humidity) use only the low rate of Assist.

**WATER VOLUME:** 80 to 160 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles capable of delivering high water volumes.

**TANK MIXES:**

- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Basagran and other herbicides, fertilizers or insecticides.

**RESTRICTIONS:**

- Rainfall: Within 8 hours will reduce control.
- Grazing: Do not graze or harvest treated crop as forage.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Poor results will occur if temperatures are cool. Apply only if day time temperatures will exceed 21°C.

**COMMENTS:** Use at least 80 L/acre water to ensure thorough coverage with this contact herbicide. Top growth of thistles will be burnt off but rapid regrowth should be expected.

### *HOE-GRASS 284 (284 g/L)*

**CAUTION: Apply to white, black and pinto beans only.**

**WEEDS CONTROLLED:** *See Field Crops Chart.*

**APPLICATION TIMING:**

a) Crop Stage: No leaf stage restrictions but do not apply within 60 days of harvest.
b) Weed Stage: Wild oats, foxtail and barnyard grass 1 to 4 leaf stage and prior to tillering; Persian darnel 1 to 3 leaf stage; volunteer corn 6 to 10 inches (15 to 25 cm) in height. Although registered for application at the 5 leaf stage of wild oats, results at this late leaf stage are inconsistent and this use is not recommended.

**RATE:** 1.42 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** 80° flat fan directed 45° forward.

**TANK MIXES:**

- Herbicides: None
- Fertilizer: None. Tank mixes with fertilizers cause severe crop injury.
- Insecticides: None

Allow 4 days between application of Hoe-Grass 284 and other herbicides and fertilizers.

**RESTRICTIONS:**

- Preharvest: Do not apply within 60 days of harvest.
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or harvest treated crop as forage.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Application under hot (above 27° C) or droughty conditions will result in reduced weed control.

**COMMENTS:** Hoe-Grass provides optimum results under cool, moist conditions, and should be applied when the majority of grassy weeds are in the 2 to 3 leaf stage for best results.

## *POAST (184 g/L)*

**WEEDS CONTROLLED:** *See rate table below.*

**APPLICATION TIMING:**
a) Crop Stage: No leaf stage restrictions but do not apply within 80 days of harvest.
b) Weed Stage: Annual weeds 2 to 5 leaf stage, quackgrass 1 to 3 leaf stage.

**RATES:**

| WEED | RATE (L/acre) WITH ASSIST | RATE (L/acre) WITH MERGE |
|---|---|---|
| green or yellow foxtail, barnyard grass, proso millet, witchgrass and volunteer corn | 0.324 – 0.405 | 0.324 – 0.405 |
| wild oats | 0.57 – 0.65 | 0.57 – 0.65 |
| volunteer wheat and oats | 0.65 | 0.57 – 0.65 |
| volunteer barley | 0.65 – 0.77 | 0.57 – 0.65 |
| quackgrass suppression | 1.78 | 1.1 |

Where a rate range is specified for a weed, use the higher rate to control heavy infestations.

**ADDITIVES:** Add Assist Oil Concentrate or Merge at 1 L/100 L spray solution for annual weeds or at 1 to 2 L/100 L spray solution for quackgrass. The use of Merge will provide more consistent annual grass control than use of Assist.

**WATER VOLUME:** 25 to 80 L/acre. Apply in at least 45 L/acre if crop or weed growth is dense and when spraying quackgrass.

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Stainless steel 80° flat fan directed 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: See Poast Power Pack recommendation for information on mixtures with ammonium sulphate.
- Insecticides: None

Allow 4 days between application of Poast and other herbicides.

**RESTRICTIONS:**
- Preharvest: Do not apply within 80 days of harvest.
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or harvest as forage.
- Recropping: A cultivation to a 4 inch (10 cm) depth is required 7 days prior to re-seeding Poast-treated fields to grass crops (such as corn, cereals or forage grasses) in the year of treatment. Allow a minimum of 14 days between application of Poast and seeding of grass crops.
- Storage: May be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Control will be reduced if weeds are not actively growing due to drought, flooding or prolonged cool (15° C or cooler) periods. Do not apply to grasses stressed for more than 20 days due to lack of moisture.

**COMMENTS:** For quackgrass suppression, rhizomes must be thoroughly fragmented prior to seeding. Control may be enhanced by inter-row cultivation but do not cultivate sooner than 7 days after application.

## *POAST (184 g/L) + POWER PACK [AMMONIUM SULPHATE (490 g/L) AND ASSIST OIL CONCENTRATE]*

**WEEDS CONTROLLED:** *See Field Crops Chart.*

**APPLICATION TIMING:**
a) Crop Stage: No leaf stage restrictions. Do not apply within 80 days of harvest.
b) Weed Stage: 2 to 5 leaf stage of annual grass weeds.

**RATE:** 0.57 L/acre Poast.
Poast Power Pack is recommended only for annual grass control in this crop. For quackgrass suppression see Poast recommendation.

**ADDITIVES:** Add 1.62 L/acre Ammonium Sulphate and Assist Oil Concentrate at 1 L/100 L spray solution.

**MIXING:** To mix, partially fill the tank with water, slowly add the Ammonium Sulphate, then add the Poast, and finally, the Assist. Maintain agitation during this process.

**WATER VOLUME:** 25 to 45 L/acre. Increase to 60 L/acre for heavy infestations of volunteer cereals.

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Stainless steel 80° flat fan nozzles directed 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: Mix only with technical grade ammonium sulphate at rates specified above.
- Insecticides: None

Allow 4 days between application of Poast + Power Pack and other herbicides.

**RESTRICTIONS:**
- Preharvest: Do not apply within 80 days of harvest.
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or harvest as forage.
- Recropping: A cultivation to a 4 inch (10 cm) depth is required 7 days prior to re-seeding Poast-treated fields to grass crops (such as corn, cereals or forage grasses) in the year of treatment. Allow a minimum of 14 days between application of Poast and seeding of grass crops.
- Storage: Poast may be frozen but do not store ammonim sulphate at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Control will be reduced if weeds are not actively growing due to drought, flooding, or prolonged cool periods (15° C or cooler). Do not apply to grasses stressed for more than 20 days due to lack of moisture.

**COMMENTS:** Since Ammonium Sulphate is corrosive, do not allow spray mixture to stand and thoroughly clean sprayer after use. Optimum results are obtained under warm, moist growing conditions. Poast Power Pack is not registered for quackgrass suppression in this crop. For quackgrass suppression see the Poast recommendation.

## Buckwheat

### Postemergence

#### *EXCEL (90 g/L)*

Excel has been registered by Agriculture Canada for use in buckwheat. However, the product label stipulates Excel must be applied at least 90 days before harvest to ensure there are no Excel residues in buckwheat seed. **Since all buckwheat varieties recommended for production in Manitoba mature in less than 90 days, this herbicide cannot be recommended for use on buckwheat in Manitoba.**

#### *HOE-GRASS 284 (284 g/L)*

**WEEDS CONTROLLED:** *See Field Crops Chart.*

**APPLICATION TIMING:**
a) Crop Stage: No leaf stage restrictions but do not apply within 60 days of harvest.
b) Weed Stage: Wild oats, foxtail and barnyard grass 1 to 4 leaf stage, prior to tillering; Persian darnel 1 to 3 leaf stage; volunteer corn 6 to 10 inches (15 to 25 cm) in height.

**RATE:** 1.01 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** 80° flat fan nozzles directed forward 45°.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Hoe-Grass 284 and other herbicides.

**RESTRICTIONS:**
- Preharvest: Do not apply within 60 days of harvest.
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or harvest as forage.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Application under hot (above 27° C) or droughty conditions will result in reduced control.

**COMMENTS:** Hoe-Grass provides optimum results under cool, moist conditions. Apply when the majority of the grassy weeds are in the 2 to 3 leaf stage for best results.

#### *POAST (184 g/L)*

Poast has been registered by Agriculture Canada for use in buckwheat. However, the product label stipulates that Poast must be applied at least 85 days before harvest to ensure there are no Poast residues in buckwheat seed. **Since all buckwheat varieties in Manitoba mature in less than 85 days, this herbicide cannot be recommended for use on buckwheat in Manitoba.**

## Canary Seed

### Postemergence

#### *AVENGE 280 C (280 g/L)*

**WEEDS CONTROLLED:** wild oats

**APPLICATION TIMING:**
a) Crop Stage: 1 to 6 leaf stage.
b) Weed Stage: 3 to 5 leaf stage.

**RATE:** 1.01 to 1.21 L/acre
Use the higher rate when there are more than 18 wild oats per square foot (200 plants per square meter).

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles directed 45° forward. Use 50 mesh nozzle screens.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Avenge and other herbicides.

**RESTRICTIONS:**
- Rainfall: Within 6 hours will reduce control.
- Grazing: Do not graze or harvest as forage within 8 weeks of treatment.
- Recropping: No restrictions the year after application.
- Storage: May be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Do not spray if crop is wet with dew or rain. Do not apply if crop is stressed from drought or excessive moisture. Do not spray if freezing temperatures are forecast.

**COMMENTS:** Avenge is most effective under warm moist conditions. Performance will be poor under dry conditions. Crop injury may occur during hot, humid weather.

## *BANVEL (480 g/L)*

**WEEDS CONTROLLED:** *See Field Crops Chart.*

**APPLICATION TIMING:**
a) Crop Stage: 3 to 5 leaf.
b) Weed Stage: 2 to 3 leaf stage and rosettes less than 2 inches (5 cm) across.

**RATES:** 0.117 L/acre Banvel tank mixed with 0.344 L/acre MCPA amine (500 g/L) For product volumes of other MCPA amine formulations *refer to Table 21.*

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan directed 45° forward.

**TANK MIXES:**
- Herbicides: Banvel should be applied as a tank mixture with MCPA amine.
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Banvel and Avenge and 7 days between application of Banvel and Mataven.

**RESTRICTIONS:**
- Rainfall: Within 8 hours will reduce control.
- Grazing: Do not graze or harvest as forage prior to crop maturity.
- Recropping: No restrictions the year following application.
- Storage: May be frozen but must be warmed to room temperature and shaken thoroughly before use.

**ENVIRONMENTAL PRECAUTIONS:** Spray when air temperature is 10° to 25° C. Avoid application when crop is under stress from adverse environmental conditions. Do not spray if risk of frost or severe drop in night temperature is forecast.

**COMMENTS:** Late application or application under hot, dry conditions or at low spray volumes can cause crop injury.

## *BUCTRIL M (560 g/L)*

**WEEDS CONTROLLED:** *See Field Crops Chart.*

**APPLICATION TIMING:**
a) Crop Stage: 3 to 5 leaf.
b) Weed Stage: 2 to 4 leaf.

**RATES:** 0.405 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Buctril M and other herbicides.

**RESTRICTIONS:**
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or cut for feed.
- Recropping: No restrictions the year after application.
- Storage: May be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Avoid spraying during drought. Under conditions of high temperature and humidity crop discoloration may occur.

**COMMENTS:** Because this is a contact herbicide poor results will occur if there is poor spray coverage. Weeds beyond the 4 leaf stage may outgrow the effects of the herbicide. Top growth of Canada thistle will be burnt off but there will be little effect on the root, so rapid regrowth can be expected. Prolonged cool weather conditions may result in reduced weed control.

## *MATAVEN L (52.5 g/L)*

**WEEDS CONTROLLED:** wild oats

**APPLICATION TIMING:**
a) Crop Stage: 1 to 6 leaf.
b) Weed Stage: 3 to 6 leaf.

**RATE:** 2.02 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 300 kPa (45 psi)

**NOZZLES:** Flat fan nozzles directed 45° forward. Use 50-mesh screens and filters.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Mataven L and Buctril M or Pardner. Allow 7 days between application of Mataven and Banvel, Stampede or Target.

**RESTRICTIONS:**
- Rainfall: Within 2 hours of application will reduce control.
- Grazing: Do not graze or harvest as forage in year of treatment.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Provides consistent control over a wide range of environmental conditions.

**COMMENTS:** When wild oat infestations are heavy, treatment at the early stage (3 to 4 leaf) will maximize crop yields by reducing competition. Later treatments, when wild oats are more mature (4 to 6 leaf) will provide more complete control of late emerging wild oats. Wild oats at 2 leaf stage and younger may escape control and grow to maturity.
Agitation will be required to re-emulsify the spray solution if it is allowed to stand for several hours.

### *PARDNER (280 g/L)*

**WEEDS CONTROLLED:** *See Field Crops Chart.*

**APPLICATION TIMING:**
a) Crop Stage: 3 to 5 leaf stage.
b) Weed Stage: 2 to 4 leaf stage except wild mustard (2 leaf stage only).

**RATE:** 0.405 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Pardner and Avenge or Mataven.

**RESTRICTIONS:**
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or cut for forage.
- Recropping: No restrictions the year after application.
- Storage: Does not require heated storage.

**ENVIRONMENTAL PRECAUTIONS:** Poor weed control can occur if cool weather prevails at application time.

**COMMENTS:** This contact herbicide requires thorough spray coverage for satisfactory results. Weeds beyond the 4 leaf stage will outgrow the effect of the herbicide.

### *STAMPEDE CM (460 g/L)*

**WEEDS CONTROLLED:** *See Field Crops Chart.*

**APPLICATION TIMING:**
a) Crop Stage: 2 to 4 leaf stage.
b) Weed Stage: Green foxtail 1 to 3 leaf stage and less than 1 inch (2.5 cm) tall. Broadleaf weeds 2 to 4 leaf stage.

**RATE:** 1.11 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles with 50 mesh screens.

**MIXING:** Partially fill tank with water which is 10° C or warmer. Add the measured amount of Stampede CM while agitation is running. Add remaining water. Do not let the mixture stand overnight.

**TANK MIXES:**
- Herbicides: No tank mixes recommended. Do not apply Stampede to crops grown in fields in which atrazine or other triazine herbicides (for example, Lexone, Sencor, Blagal, Bladex, Marksman, Laddok, Simadex or Princep) have been applied until soil analysis confirms that the triazine residues have completely disappeared.

Allow 3 days between application of Stampede CM and other herbicides.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 4 hours will reduce control.
- Grazing: Do not graze or harvest as forage prior to crop maturity.
- Recropping: No restrictions the year after application.
- Storage: Do not store at temperatures below -9° C.

**ENVIRONMENTAL PRECAUTIONS:** Best weed control occurs when temperature is 21° C or warmer and relative humidity is high. Do not spray when temperatures are below 10° C or when daily high is expected to reach 30° C. Crops damaged by winds should be fully recovered before applying Stampede CM. Do not spray if frost is expected within 24 hours of application. Control will be poor if top soil is dry to a depth of 2 inches (5 cm) or more.

**COMMENTS:** Leaf discoloration and burn may occur on the crop, particularly under hot, dry conditions. Under these conditions, early morning or evening spraying is recommended. Stampede is a contact herbicide and thorough spray coverage is required for best results. Early application (2 to 3 leaf stage) on foxtail is essential. Stampede will not control foxtail or broadleaf weeds that emerge after application. Application by aircraft or Spra-Coupe is not recommended.

### *TARGET (400 g/L)*

**WEEDS CONTROLLED:** *See Field Crops Chart.*

**APPLICATION TIMING:**
a) Crop Stage: 2 to 5 leaf stage.

b) Weed Stage: 2 to 4 leaf stage. Cleavers 1 to 2 whorl stage.

**RATES:** 0.405 to 0.61 L/acre.
Use the higher rate under adverse weather conditions, when weed density is high or for cleavers control.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 200 to 300 kPa (30 to 45 psi)

**NOZZLES:** Flat fan nozzles with 50-mesh screens and filters.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Target and Avenge and 7 days between application of Target and Mataven.

**RESTRICTIONS:**
- Rainfall: Within 3 hours will reduce control.
- Grazing: Do not graze or harvest as forage for 7 days after application.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Poor control will occur if weeds are not actively growing due to stress. Best results occur at 10° C to 25° C. Do not use if frost or a severe drop in night time temperature is forecast.

**COMMENTS:** Treatment after the 5 leaf stage will cause crop injury. Do not let spray mixture stand without agitation.

## Caraway

**There are no herbicides currently registered in Canada for use in caraway.**

# Corn
## (Grain and Silage)

### TABLE 7 HERBICIDES FOR CORN

| WEEDS<br>HERBICIDES | Barnyard Grass | Cereal Grains | Foxtail, Green | Foxtail, Yellow | Wild Oats | Quack Grass | Bindweed, Field | Blue Bur | Buckwheat, Volunteer | Buckwheat, Tartary | Buckwheat, Wild | Burdock | Catchfly, Night Flowering | Chickweed | Cleavers | Cockle, Cow | Cocklebur | Corn Spurry | Dandelion | Flixweed |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aatrex-Plus/Atra-Mix/Atrazine plus oil[a] | ● | ○ | ● | ● | ● | S[c] | | | ○ | | ● | | | | | | | | | |
| Basagran | | | | | | | ●[d] | | | | | | | ● | | | ● | | | |
| Banvel[g] | | | | | | | □ | | | ● | ● | | | | ● | ● | | ● | | |
| Banvel plus 2,4-D amine[h] | | | | | | | □ | ● | ○ | ● | ● | ● | ○ | | ● | ● | ● | ● | | ● |
| Bladex[a,e] | ● | | ● | ● | | | | | | | ● | | | | | | | | | |
| Bladex[a,f] + Bio-Veg | ● | | ● | ● | | | | | | | ● | | | | | | | | | |
| Bladex[a] + Dual | ● | | ● | ● | | | | | | | ● | | | | | | | | | |
| Bladex[a] + Eradicane | ● | ● | ● | ● | ● | | | | | | ● | | | | | | | | | |
| Bladex[a] + Sutan + | ● | | ● | ● | | | | | | | ● | | | | | | | | | |
| Buctril M | | | | | | | | ● | ● | ● | ● | | | | | ● | ● | | | ● |
| Dual | ● | | ● | ● | | | | | | | | | | | | | | | | |
| Eradicane | ● | ● | ● | ● | ● | S | | | | | | | | ● | | | | | | |
| Eradicane plus Atrazine[a] | ● | ● | ● | ● | ● | S | | | | | ○ | | | ● | | | | | | |
| Kil-Mor[b] | | | | | | | | ○ | ● | ● | ● | ○ | ○ | | ○ | ● | ● | | | ● |
| Laddock | | | | | | | | | | | | | | ● | | | ● | ● | | |
| Marksman | | | | | | | □ | | | ● | ● | | | | ● | ● | | ● | | |
| Pardner | | | | | | | | | | ● | ● | | ● | | | ● | ● | | | |
| Primextra[a] | ● | | ● | ● | | | | | | | ● | | | | | | | | | |
| Sutan + | ● | | ● | ● | | | | | | | | | | | | | | | | |
| Sutan + plus Atrazine[a] | ● | | ● | ● | ● | | | | | | ● | | | | | | | | | |
| 2,4-D[b] | | | | | | | | ● | | | | ● | | | | | ● | | | ● |

| WEEDS<br>HERBICIDES | Galinsoga, Hairy | Goat's-beard | Goosefoot, Oakleaved | Henbit | Knotweed, Prostrate | Kochia | Lamb's-Quarters | Lettuce, Prickly | Mustard, Ball | Mustard, Dog | Mustard, Hare's-ear | Mustard, Indian | Mustard, Tame | Mustard, Tumble | Mustard, Wild | Mustard, Wormseed | Nightshade | Pigweed, Prostrate | Pigweed, Red Root | Pigweed, Russian |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aatrex-Plus/Atra-Mix/Atrazine plus oil[a] | | | | | | | ● | | ● | ● | ● | ● | ● | ● | ● | ● | | | ● | |
| Basagran | | | | | | | ● | | | | | | | | ● | | | | ● | |
| Banvel[g] | | | | | | ● | ● | | ● | ● | ● | ● | ● | ● | ● | ● | | | ● | |
| Banvel plus 2,4-D amine[h] | | | | | | | ● | | ● | ● | ● | ● | | ● | ● | ● | | ● | ● | ● |
| Bladex[a,e] | | | ● | | ● | | ● | | | | | | | | ● | ● | ● | | ● | |
| Bladex[a,f] + Bio-Veg | | | ● | | ● | | ● | | | | | | | | ● | ● | ● | | ● | |
| Bladex[a] + Dual | | | ● | | ● | | ● | | | | | | | | ● | ● | ● | | ● | |
| Bladex[a] + Eradicane | | | ● | | ● | | ● | | | | | | | | ● | ● | ● | | ● | |
| Bladex[a] + Sutan + | | | ● | | ● | | ● | | | | | | | | ● | ● | ● | | ● | |
| Buctril M | | | | | | ● | ● | | ● | | | | | ● | ● | ● | | | ● | |
| Dual | | | | | | | | | | | | | | | | | | | | |
| Eradicane | | | | ● | | | | | | | | | | | | | ● | ● | ● | |
| Eradicane plus Atrazine[a] | | | | ● | | | | | | | | | | | ● | | ● | ● | ● | |
| Kil-Mor[b] | | | | | ● | | ● | | ● | ● | ● | ● | ○ | ● | ● | ● | | ● | ● | ○ |
| Laddock | | | | | | | ● | | | | | | | | ● | | ● | | ● | |
| Marksman | | | | | | | ● | | | | ● | ● | | ● | ● | ● | | | ● | ● |
| Pardner | | | | | | | ● | | | | | | | | ● | | ● | | | |
| Primextra[a] | | | | | | | ● | | | | | | | | ● | | | | ● | |
| Sutan + | | | | | | | | | | | | | | | | | | | | |
| Sutan + plus Atrazine[a] | | | | | | | ● | | | | | | | | ● | | | | ● | |
| 2,4-D[b] | ● | ● | ● | | | | ● | ● | ● | ● | ● | ● | ○ | ● | ● | ● | | | | ● |

| WEEDS<br>HERBICIDES | Pigweed, Tumble | Purslane | Radish, Wild | Ragweed, Common | Ragweed, False | Ragweed, Giant | Rapeseed, Volunteer | Russian-thistle | Shepherd's Purse | Annual Smartweed Species, Lady's Thumb | Sow Thistle (Annual) | Sow Thistle (Perennial) | Spurge, Thyme-leaved | Stinkweed | Sunflower, Prairie | Sunflower, Volunteer | Sweet Clover, White | Thistle, Canada |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aatrex-Plus/Atra-Mix/Atrazine plus oil[a] | | ● | | ● | ● | ● | | | | ● | | | | ○ | | | ● | |
| Basagran | | ● | | ● | | ● | | ● | | ● | | | | | | | | □[d] |
| Banvel[g] | | | | ● | ● | ● | | | | ● | | | | | | | | □ |
| Banvel plus 2,4-D amine[h] | | | ● | ● | ● | ● | | ● | ● | ● | ● | | | ● | ○ | ○ | ● | □ |
| Bladex[a,e] | | ● | | ● | ● | | | ● | ● | ● | | | | | | | | |
| Bladex[a,f] + Bio-Veg | | ● | | ● | ● | | | ● | ● | ● | | | | | | | | |
| Bladex[a] + Dual | | ● | | ● | ● | | | ● | ● | ● | | | | | | | | |
| Bladex[a] + Eradicane | | ● | | ● | ● | | | ● | ● | ● | | | | | | | | |
| Bladex[a] + Sutan + | | ● | | ● | ● | | | ● | ● | ● | | | | | | | | |
| Buctril M | | | | ● | | | ● | ● | ● | ● | ○ | | | ● | ○ | ● | | |
| Dual | | | | | | | | | | | | | | | | | | |
| Eradicane | | ● | | | | | | | | | | | | | | | | |
| Eradicane plus Atrazine[a] | | ● | | ● | | | | | | ● | | | | | | | | |
| Kil-Mor[b] | | | | ● | ● | ● | ○ | ● | ● | ● | ● | | | ● | ○ | ○ | ○ | □ |
| Laddock | | ● | | ● | | ● | | ● | | ● | | | | | | | | |
| Marksman | | | | ● | ● | ● | | | | ● | | □ | | | | | | □ |
| Pardner | | | | | | | | ● | | ● | | | | ● | | | | |
| Primextra[a] | | ● | | ● | | | | | | ● | | | | | | | | |
| Sutan + | | | | | | | | | | | | | | | | | | |
| Sutan + plus Atrazine[a] | | ● | | ● | | | | | | ● | | | | | | | ● | |
| 2,4-D[b] | ○ | ● | ● | ● | ● | ● | | ● | ● | | ● | | ● | ● | ○ | S | ○ | □ |

**LEGEND**

- ● Controlled by rates recommended for corn. Where two or more brand names are recommended, the weed may not appear on all labels.
- ○ Not labelled for control but control or suppression is possible.
- S Suppression.
- □ Top growth suppression only.

[a] These treatments may remain as a residue in the soil the following year. Flax, peas, triazine tolerant canola and fababeans are more tolerant crops. See comments in corn section for specific instructions.

[b] Apply as an overall spray until corn is 6 inches (15 cm) tall with leaf outstretched. After this stage use a directed spray. When using the 0.69 L/acre rate of formulations containing 500 g/L 2,4-D, use only as a directed spray to avoid crop injury. For equivalent product volumes of other 2,4-D formulations see Table 21.

[c] Use a split application of 1.82 L/acre of liquid formulations containing 500 g/L atrazine or 1.01 kg/acre of wettable powder formulations containing 90 per cent atrazine, preplant incorporated, followed by the same rate of atrazine with oil early postemergence. For equivalent weights or volumes of other atrazine formulations see Table 20. See product label for application instructions.

[d] Split applications required for adequate control.

[e] Use under irrigated conditions only.

[f] Apply postemergence. Use Bladex 80 W only.

[g] Apply as an overall spray until corn is 8 inches (20 cm) tall as it stands. After this stage use a directed spray.

[h] Apply up to the 4-inch (10 cm) height of corn as it stands. After this stage, use a directed spray.

## Corn, Grain and Silage

**CAUTION:** *Any treatments containing atrazine leave a residue in the soil which may affect the subsequent crop. For rotational corn, non-residual treatments are preferred to allow cropping flexibility. Triazine tolerant canola is tolerant to residues from field applications of atrazine. Flax, peas, and fababeans have some tolerance and are usually not affected by rates of up to 0.9 L/acre of liquid formulations containing 500 g/L atrazine or 0.5 kg/acre of wettable powder formulations containing 90 per cent atrazine applied in the spring of previous year. If rates exceed 0.9 L/acre of formulations containing 500 g/L atrazine or 0.5 kg/acre of wettable powder formulations containing 90 per cent atrazine, then atrazine may affect even these more tolerant crops the following year, and more susceptible crops may be affected for two to three years after application. Corn or triazine tolerant canola is recommended to follow these higher rates of atrazine. For equivalent volumes or weights of other atrazine formulations, see Table 20.*

*Bladex may leave a residue in the soil. Plant only corn, cereals, potatoes, flax, rapeseed (canola), triazine tolerant canola, sunflowers, soybeans or peas the year following Bladex application. Carryover will be greater on clay and clay loam soils and under dry conditions. Residue carryover following repeated applications of Bladex (two or more consecutive years) has not been fully evaluated and could result in damage to more sensitive crops such as rapeseed (canola), sunflowers or cereals.*

*To reduce the levels of residue in the soil, atrazine or Bladex may be applied in a band instead of as a broadcast treatment, so the overall rate of application is reduced. Thorough mixing of the treated soil after the cropping year will result in a reduction of the residue problem.*

### Preplant Incorporated

***Bladex L (480 g/L), Bladex 80 W (80%) plus Dual (960 g/L)*** Controls several grassy and broadleaf weeds. See *Table 7.* Apply Bladex L at 1.72 to 2.02 L/acre or Bladex 80 W at 1.01 to 1.21 kg/acre in combination with Dual at 0.81 to 1.11 L/acre. Apply in 60 L/acre water and incorporate in the top two inches (five cm) of soil with a tandem disc, vibrating shank cultivator or harrows set to work the soil no deeper than four inches (10 cm). Immediate incorporation is not required. Use the lower rates on light soils and the higher rates on medium textured and high organic matter soils (above five per cent). Do not use on peat or muck soils. Do not use on soils with less than one per cent organic matter. Bladex may leave a residue in the soil. See caution note at beginning of the corn section.

***Bladex L (480 g/L), Bladex 80 W (80%) plus Eradicane 8-E (800 g/L)*** Controls several grasses and broadleaf weeds. See *Table 7.* Apply Bladex L at 1.72 to 2.02 L/acre or Bladex 80 W at 1.01 to 1.21 kg/acre in combination with 1.72 to 3.44 L/acre of Eradicane 8-E in 45 L/acre water to the dry soil surface of a well prepared seedbed. Spray and incorporate immediately. Refer to the *Herbicide Incorporation* section under "Eradicane" for incorporation instructions. Use the lower rate of Bladex on light textured soils. Do not use on soils with less than one per cent organic matter. Do not use on soils treated with Eradicane, Eptam or Sutan the previous year. Bladex may leave a residue in the soil. See caution note at the beginning of the corn section.

***Bladex L (480 g/L), Bladex 80 W (80%) plus Sutan + (800 g/L)*** Controls several grasses and broadleaf weeds. See *Table 7.* Apply Bladex L at 1.72 to 2.02 L/acre or Bladex 80 W at 1.01 to 1.21 kg/acre in combination with 1.72 to 2.23 L/acre of Sutan + in 45 L/acre water to the dry soil surface of a well prepared seedbed and incorporate immediately. See the *Herbicide Incorporation* section under "Eradicane" for incorporation instructions. Use the lower rate of Bladex on light textured soils and the higher rate on medium textured soils. Do not use on soils with less than one per cent organic matter. Do not use on soils treated with Eptam, Eradicane or Sutan the previous year. Bladex may leave a residue in the soil. See the caution note at the beginning of the corn section.

***Dual (960 g/L)*** Controls green and yellow foxtail and barnyard grass. Apply 0.81 to 1.11 L/acre in a minimum of 60 L/acre of water. Incorporate in the top two inches (five cm) of soil with a tandem disc or vibrating shank cultivator set to work the soil no deeper than four inches (10 cm). Immediate incorporation is not required. Do not use on peat or muck soils. Dual may be tank mixed with Aatrex or Atrazine. Incorporation instructions are given in the *Herbicide Incorporation* section. Heavy rainfall following application may result in reduced weed control, especially on sandy soils.

***Eradicane 8-E (800 g/L)*** Controls several grasses and broadleaf weeds. (Table 7). Apply 1.72 to 3.44 L/acre in a minimum of 45 L/acre water to the dry soil surface of a well prepared seedbed. Spray and incorporate immediately. Refer to *Herbicide Incorporation* section for incorporation instructions. Eradicane 8-E may be applied with liquid fertilizer or on dry fertilizer. Refer to the *Herbicide Incorporation* section for application and incorporation instructions. Use the 3.44 L/acre rate to suppress quack grass. Cut the underground rhizomes of quack grass thoroughly so that four or less nodes remain on the strand.

**CAUTION:** *The level of weed control will be reduced where Eradicane is used on soils which have been treated with Eradicane or Eptam or Sutan + the previous growing season. It is anticipated that the reduction in control will be greater where Eradicane, Eptam or Sutan + has been used repeatedly for two or more years.*

**Eradicane 8-E (800 g/L) plus Atrazine** Controls several grasses and broadleaf weeds (Table 7). Apply 1.72 to 2.23 L/acre Eradicane and 0.93 to 1.46 L/acre of liquid atrazine formulations containing 500 g/L atrazine or 0.53 to 0.81 kg/acre of wettable powder formulations containing 90 per cent atrazine. For product weights or volumes of other atrazine formulations, see Table 20. Use the higher rates on soils containing more than four per cent organic matter. Eradicane 8-E plus atrazine may be applied with liquid fertilizer or on dry fertilizer. See the *Herbicide Incorporation* section for incorporation instructions. This combination may leave a residue in the soil. See caution note at the beginning of the corn section.

***Primextra (500 g/L)*** Controls green and yellow foxtail, barnyard grass and several broadleaf weeds(Table 7). Apply 2.71 to 3.44 L/acre to a firm seedbed in a minimum of 60 L/acre water. Do not use on peat or muck soils, or coarse-textured soils low in organic mater. Use the higher rate for heavy weed infestations. Refer to *Herbicide Incorporation* section for incorporation instructions. Heavy rainfall following application may result in reduced weed control, especially on sandy soils. Primextra contains atrazine. Residues may affect sensitive crops in subsequent years. See the caution note at the beginning of the corn section.

***Sutan + (800 g/L)*** Controls green and yellow foxtail and barnyard grass. Apply 1.72 to 2.23 L/acre in a minimum of 45 L/acre water to the dry soil surface of a well prepared seedbed. For incorporation instructions, refer to "Eradicane and Sutan + " in the *Herbicide Incorporation* section. Sutan + may be applied with liquid fertilizer or on dry granular fertilizers. To apply with dry fertilizer, spray the herbicide onto the fertilizer using a rotary drum type blender. A minimum of 80 kg/acre of fertilizer is necessary to ensure uniform distribution through the soil. Do not use nitrate fertilizers. Consult the label for a listing of recommended fertilizer types. Apply to a dry soil surface using a double overlap pattern to ensure even distribution.

Under cool soil conditions, Sutan + should be tank mixed with atrazine or Bladex.

**CAUTION:** *The level of weed control will be reduced where Sutan + is used on soils which have been treated with Eradicane, Eptam or Sutan + the previous growing season. It is anticipated that the reduction in control will be greater where these herbicides have been used repeatedly for two or more years.*

***Sutan + (800 g/L) and Atrazine*** Controls several grasses and broadleaf weeds. (Table 7) Apply 1.72 to 2.23 L/acre Sutan + and 0.91 L/acre of liquid formulations containing 500 g/L atrazine or 0.51 kg/acre of wettable powder formulations containing 90 per cent atrazine as a tank mix in a minimum of 45 L/acre water. For product weights or volumes of other Atrazine formulations see Table 20. Apply to the dry soil surface of a well prepared seedbed. Refer to *Herbicide Incorporation* section for incorporation instructions. This combination may leave a residue in the soil. See caution note at the beginning of the corn section. Sutan + plus atrazine may be applied with liquid fertilizer or on dry granular fertilizers.

### Preemergence

***The following herbicides are recommended for preemergence application under irrigated conditions only.***

***Aatrex Liquid, Aatrex Nine-O, Aatrex 90W, Atrazine 500, Atrazine 80W, Atrazine 90W*** Controls wild oats and several broadleaf weeds. See Table 7. Apply 1.82 to 2.73 L/acre of liquid formulations containing 500 g/L or 1.01 to 1.36 kg/acre of wettable powder formulations containing 90 per cent atrazine after seeding but before crop or weed emergence. For equivalent weights or volumes of other atrazine formulations see Table 20. Rain or irrigation of at least 0.5 inches (1.25 cm) is required within seven days following application for satisfactory results. May be tank mixed with Bladex or Dual. Apply 1.01 L/acre of liquid atrazine formulations containing 500 g/L atrazine or 0.51 kg/acre of wettable powder formulations containing 90 per cent atrazine tank mixed with 1.92 L/acre of Bladex liquid or 1.11 kg/acre of Bladex 80W or with 0.81 to 1.11 L/acre of Dual. Atrazine products may leave a residue in the soil. See caution note at the beginning of the corn section.

***Bladex (480 g/L), Bladex 80W (80%)*** Controls green and yellow foxtail, barnyard grass, and several broadleaf weeds. See Table 7. Apply 1.92 to 2.02 L/acre of Bladex liquid or 1.11 to 1.21 kg/acre of Bladex 80W in 60 to 120 L/acre water prior to crop and weed emergence. Use the higher rate on sandy loam soils. Use only on sandy and sandy loam soils. Do not use on soils containing less than one per cent organic matter or on soils containing more than 70 per cent sand. Rain or irrigation of at least 0.5 inches (1.25 cm) is required within seven days following application for satisfactory results. Bladex leaves a residue in the soil which may affect subsequent crops. See the caution note at the beginning of the corn section. Bladex may be tank mixed with atrazine products or with Dual.

***Dual (960 g/L)*** Controls green and yellow foxtail and barnyard grass. Apply 0.81 to 1.11 L/acre in a minimum of 60 L/acre of water after planting but prior to crop and weed emergence. Rain or irrigation of at least 0.5 inches (1.25 cm) is required within 10 days following application for satisfactory results. Do not use on peat or muck soils. Heavy rainfall or excessive irrigation following application may result in reduced weed control, especially on sandy soils. Dual may be tank mixed with atrazine products or Bladex.

***Primextra (500 g/L)*** Controls green and yellow foxtail, barnyard grass and several broadleaf weeds. See Table 7. Apply 2.71 to 3.44 L/acre in a minimum of 60 L/acre of water after seeding but before crop or weed emergence. Use the higher rate for heavy weed infestations. Rain or irrigation of at least 0.5 inches (1.25 cm) is required within seven days following application for satisfactory results. This product contains atrazine and may leave a residue in the soil. See the caution note at the beginning of the corn section.

### Postemergence

***Aatrex Liquid, Aatrex Nine-O, Aatrex 90 W, Atrazine Flowable, Atrazine 80 W, Atrazine 90 W, and Oil (Non-Herbicidal) or Oil Concentrate*** Controls wild oats, seedling green and yellow foxtail, and several broadleaf weeds (Table 7). Apply 1.82 to 2.73 L/acre of liquid formulations containing 500 g/L or 1.01 to 1.36 kg/acre of wettable powder formulations containing 90 per cent atrazine with 6.88 L/acre oil in 80 to 120 L/acre water or 1.13 L/acre oil concentrate in 60 L/acre water.

### Corn, Grain and Silage

See Table 20 for product volumes of other Aatrex or Atrazine formulations. Apply when foxtail is in the 1 to 2 leaf stage. Foxtail control has not always been consistent. Do not add other herbicides such as 2,4-D to combinations of oil-water emulsions and Aatrex or Atrazine. These products may leave a residue in the soil. See caution note at the beginning of the corn section.

***Aatrex-Plus (400 g/L), Atra-Mix (400 g/L)*** Controls wild oats, seedling green and yellow foxtail, and several broadleaf weeds (Table 7). Apply 1.72 to 3.44 L/acre in 80 to 120 L/acre water when foxtail is in the 1 to 2 leaf stage. Foxtail control has not always been consistent. Do not add other herbicides such as 2,4-D. Aatrex-Plus and Atra-Mix contain oil concentrate. Additional oil or oil concentrate should not be added. These products may leave a residue in the soil. See caution note at the beginning of the corn section.

***Atrazine*** see Aatrex.

***Basagran (480 g/L)*** Controls several broadleaf weeds (Table 7). Apply 0.71 to 0.91 L/acre in 80 to 160 L/acre water. Use the lower rate to control lady's thumb and annual smartweed species 1 to 3 inches (2.5 to 7.5 cm) high, flower-of-an-hour 1 to 2 inches (2.5 to 5.0 cm) high, wild mustard 1 to 5 inches (2.5 to 12.5 cm) high, or cocklebur 3 to 7 inches (7.5 to 17.5 cm) high. Use the higher rate of Basagran and the higher recommended water volumes to control lady's thumb and annual smartweed species 3 to 8 inches (7.5 to 20 cm) high, Venice mallow 2 to 4 inches (5 to 10 cm) high, cocklebur 7 to 12 inches (17.5 to 30 cm) high, and seedlings of other susceptible weeds. To suppress top growth of Canada thistle (patch treatments) apply 0.71 L/acre and another 0.71 L/acre seven to ten days later. Apply in 80 to 160 L/acre of water when thistles are 6 to 8 inches (15 to 20 cm) tall. The addition of Citowett Plus at 2.5 L/1000 L or Assist Oil Concentrate at 5 to 10 L/1000 L spray mixture will improve the control of advanced weeds. Best results are obtained when Basagran is applied under warm temperature conditions (21 ° C). Do not apply if rain is expected within eight hours.

***Banvel (480 g/L)*** Controls several broadleaf weeds (Table 7). Apply 0.236 L/acre in 45 to 90 L/acre water at 45 psi (300 kPa) pressure. Apply up to the 8 inch (20 cm) height of corn as it stands. When corn is higher than 8 inches (20 cm) drop-nozzles must be used to direct spray to plant base.

Do not graze cattle or harvest for silage until seven days following Banvel application. Do not apply within 12 weeks of harvest.

***Banvel (480 g/L) plus 2,4-D amine*** Controls several broadleaf weeds (Table 7). Apply 0.142 L/acre Banvel plus 0.344 L/acre of formulations containing 500 g/L 2,4-D amine in 45 to 90 L/acre water at 45 psi (300 kPa) pressure. For product volumes of other 2,4-D amine formulations see Table 21. Apply up to the 4 inch (10 cm) height of corn as it stands and no later than the three leaf stage. When corn is higher than 4 inches (10 cm) drop-nozzles must be used to direct spray to plant base.

Do not graze cattle or harvest for silage until seven days following Banvel application. Do not apply within 12 weeks of harvest.

***Bladex 80 W (80%)*** Controls several grasses and broadleaf weeds. See Table 7. Apply Bladex 80 W at 1.11 kg/acre plus Bio-Veg at 1 L/100 L spray solution in 60 to 80 L/acre water. Apply when annual grasses are in the 1 to 2 leaf stage and broadleaf weeds are 0.5 to 2.0 inches (1.25 to 5.0 cm) in height. Do not apply after the three leaf stage of the corn or when corn is under stress due to prolonged cold, wet, growing conditions. Crop injury may occur if cold, wet growing conditions are experienced within seven days after application. Do not use any oils or adjuvants other than Bio-Veg with Bladex. Do not tank mix with other pesticides. Bladex may leave a residue in the soil. See the caution note at the beginning of the corn section.

***Buctril M (560 g/L)*** Controls several broadleaf weeds (Table 7). Apply 0.405 L/acre in 80 to 120 L/acre water at a pressure of 40 psi (275 kPa) when corn is in the 4 to 6 leaf stage and weed seedlings are small. Leaf scorch may occur if application is made under hot, humid conditions or under excessively cool wet conditions.

***Laddok (400 g/L)*** Controls several broadleaf weeds. See Table 7. Apply 1.21 to 1.62 L/acre in 80 to 160 L/acre water at a minimum of 40 psi (275 kPa) pressure. All applications must include Assist Oil Concentrate at 1 L/100 L of spray solution. Do not use floodjet type nozzles. Use the 1.21 L/acre rate for control of annual smartweed species (lady's thumb) 1 to 3 inches (2.5 to 7.5 cm) high, wild mustard 1 to 5 inches (2.5 to 12.5 cm) high, cocklebur 3 to 7 inches (7.5 to 17.5 cm) high and flower-of-an-hour 1 to 2 inches (2.5 to 5.0 cm) high. Use the 1.62 L/acre rate for control of annual smartweed species (lady's thumb) 3 to 8 inches (7.5 to 20 cm) high, wild mustard 5 to 10 inches (12.5 to 25 cm) high cocklebur 7 to 12 inches (17.5 to 30 cm) high, Venice mallow 2 to 4 inches (5 to 10 cm) high and seedlings of other susceptible weeds. Use the higher recommended water volumes for dense weed infestations. Increasing pressure to 60 psi (425 kPa) will improve penetration of the herbicide through the canopy but increases the potential for spray drift. This treatment will not control green foxtail. Laddock contains atrazine. Plant only corn, flax, peas, triazine tolerant canola or fababeans the year following Laddok application. Do not apply if rain is expected within eight hours of application.

***Kil-mor (500 g/L)*** Controls several broadleaf weeds (Table 7). Apply 0.34 to 0.445 L/acre in a minimum of 45 L/acre water. Apply as an overall application before corn reaches 6 inches (15 cm) in height (top leaf extended) and before broadleaf weeds reach 4 inches (10 cm) in height. If extended periods of either cold, wet weather or very hot, dry weather are experienced after application, corn may become brittle and prone to lodging. Do not cultivate for 2 weeks following application. Heavy winds during the 2 week period following application may cause stalk lodging. Do not apply if rain is expected within 6 hours.

***Marksman (401 g/L)*** Controls several grassy and broadleaf weeds. *See Table 7.* Apply to the crop from the 1 leaf stage up to the 5 inch (12.5 cm) height of corn as it stands. Broadleaf weeds should be no larger than 2 inches (5 cm) in height or diameter. Apply 1.49 L/acre on sandy or sandy loam soils or 1.82 L/acre on medium to heavy textured soils in 90 to 120 L/acre water. Do not spray near sensitive crops (cereals or broadleaf crops) if temperatures exceed 30° C or if the prevailing wind is blowing toward neighbouring fields. This product contains atrazine and will leave a residue in the soil. See caution note at the beginning of this section.

***Pardner (280 g/L)*** Controls several broadleaf weeds (Table 7). Apply 0.405 to 0.485 L/acre in at least 80 to 120 L/acre water. Apply when corn is in the 4 to 8 leaf stage and before the weeds are past the 4 leaf stage. Do not apply under conditions of high humidity and high temperature (greater than 27° C) or crop injury may occur.

***2,4-D Amine*** Controls several broadleaf weeds (Table 7). Apply 0.45 to 0.61 L/acre of formulations containing 500 g/L 2,4-D in 45 L/acre water as an overall spray until corn is 6 inches (15 cm) tall (leaf outstretched), after which a directed spray should be used. See directed postemergence recommendations in this section. For product volumes of other 2,4-D amine formulations refer to Table 21.

### Directed Postemergence

*Application of these herbicides requires positioning the sprayer nozzles to direct the spray to the base of the corn plant. Severe damage is likely if the crop leaves are sprayed.*

***Banvel (480 g/L)*** Controls several broadleaf weeds (Table 7). Apply 0.236 L/acre in 45 to 90 L/acre water at 45 psi (300 kPa) pressure. Direct spray to base of plant after corn is more than 8 inches (20 cm) tall as it stands. Apply no later than 2 weeks prior to tassle emergence and before corn is over 20 inches (50 cm) tall. Do not graze cattle or harvest for silage until 7 days following Banvel application. Do not apply within 12 weeks of harvest.

***Banvel (480 g/L) plus 2,4-D amine*** Controls several broadleaf weeds (Table 7). Apply 0.142 L/acre Banvel plus 0.344 L/acre of formulations containing 500 g/L 2,4-D in 45 to 90 L/acre water at 45 psi (300 kPa) pressure. Direct spray to base of plant after corn is more than 4 inches (10 cm) tall as it stands. Apply no later than 2 weeks prior to tassle emergence. Apply before corn is over 20 inches (50 cm) tall. For product volumes of other 2,4-D amine formulations see Table 21.

Do not graze cattle or harvest for silage until seven days following Banvel application. Do not apply within 12 weeks of harvest.

***Kil-mor (500 g/L)*** Controls several broadleaf weeds. (Table 7). Apply 0.445 L/acre in 100 to 120 L/acre water. Direct spray to plant base after corn is more than 12 inches (30 cm) tall, top leaf extended.

Do not allow the spray solution to contact the corn stalk above the point where the first leaf meets the stem. If extended periods of either cold, wet weather or very hot, dry weather are experienced after application, corn may become brittle and prone to lodging. Do not cultivate for two weeks following application. Heavy winds during the 2 week period following application may cause stalk lodging. Do not apply to corn between 6 inches (15 cm) and 12 inches (30 cm) tall, as it stands.

***2,4-D amine*** Controls several broadleaf weeds (Table 7). Apply 0.61 L/acre of formulations containing 500 g/L 2,4-D in 45 to 80 L/acre water. Treat by directing spray to base of plant after corn is more than 6 inches (15 cm) tall (leaf outstretched). For product volumes of other 2,4-D amine formulations see Table 21.

## *Crambe*

### Preplant Incorporated

***RIVAL (500 g/L), RIVAL 10 G (10%), TREFLAN EC (545 g/L), TREFLAN QR 5 (5%), TRIFLUREX (400 g/L)***

**WEEDS CONTROLLED:** *See Field Crops Chart.*

**Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Rival, Treflan or Triflurex will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:**

a) Crop Stage: preplant incorporated — spring only.
b) Weed Stage: preemergence.

**RATES:**

| Product | SOIL TYPE | |
|---|---|---|
| | Light soils with less than 6% organic matter | Medium to heavy soils with 6–15% organic matter |
| Rival | 0.65 L/acre | 0.9 – 1.1 L/acre |
| Rival 10 G | 3.4 kg/acre | 4.45 – 5.7 kg/acre |
| Treflan EC | 0.61 L/acre | 0.81 – 1.06 L/acre |
| Treflan QR 5 | 6.9 kg/acre | 8.9 – 11.3 kg/acre |
| Triflurex | 0.81 L/acre | 1.1 L/acre |

**WATER VOLUME:** 45 L/acre (liquid product only).

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles for liquid formulations; suitable granular applicator for granular products.

**INCORPORATION:** Two incorporations required at right angles for thorough mixing. The first incorporation must be completed within 24 hours of spraying. The second incorporation may be done immediately after the first when using the liquid formulation. When using the granular delay the second incorporation for 3 days after the first. *See Herbicide Incorporation section* for additional detail.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: May be applied with liquid fertilizer (eg. 28-0-0). Conduct a compatability test before mixing. Rival EC or Treflan EC may be impregnated onto dry bulk fertilizer. Consult the *Herbicide Information* section for details.
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: No effect once incorporated.
- Grazing: Do not graze or harvest for livestock feed in the year of treatment.
- Recropping: Rival, Treflan and Triflurex leave a residue in the soil which may affect subsequent crops. *See Table 24* for a list of susceptible crops.
- Storage: Do not freeze. If stored below 5° C bring contents to 15° C for 24 hours and shake well before using.

**ENVIRONMENTAL PRECAUTIONS:** Poor results will occur if dry conditions prevail between application time and weed emergence.

**COMMENTS:** Liquid applications are more suited to spring application and generally provide a higher level of weed control than granular products applied in the spring. Granular product should be considered if trash is heavy.

## *Fababeans*

### Preplant Incorporated

Manitoba Agriculture does not recommend fall application of soil incorporated herbicides to soils which are subject to wind or water erosion. Fall application to summerfallow fields, to soils with light trash cover or to light textured soils may predispose the field to erosion by wind and water and is not recommended.

### *EDGE DF (50%), EDGE GRANULAR (5%)*

**WEEDS CONTROLLED:** See *Field Crops Chart.*

**CAUTION: Trifluralin-resistant green foxtail has developed in Manitoba. Edge will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:**
a) Crop Stage: preplant incorporated
b) Weed Stage: pre-emergence

**RATES:**

| Product | SOIL TYPE | | | |
|---|---|---|---|---|
| | Light Textured Soils 2 - 6% Organic Matter | MEDIUM TO HEAVY TEXTURED SOILS | | |
| | | 2 - 4% Organic Matter | 4 - 6% Organic Matter | 6 - 15% Organic Matter |
| Spring Edge DF | 0.69 kg/acre | 0.69 kg/acre | 0.89 kg/acre | 1.13 kg/acre |
| Fall Edge Granular | Not Recommended* | 8.9 kg/acre | 11.3 kg/acre | 11.3 kg/acre |
| Spring Edge Granular | 6.9 kg/acre | 6.9 kg/acre | 11.3 kg/acre | 11.3 kg/acre |

* The two fall incorporations required will leave light soils vulnerable to wind or water erosion. This use is not recommended.

Although Edge DF is registered for use in the fall, this is not recommended as incorporation requirements may predispose fields to erosion.

**APPLICATION:** Edge granular - granular applicator. Edge DF - sprayer equipped with jet or perforated pipe agitation (Return line agitation is not sufficient).

**WATER VOLUME:** 45 L/acre (Edge DF only)

**PRESSURE:** 275 kPa (40 psi) (Edge DF only)

**NOZZLES:** Flat fan equipped with 50-mesh or coarser nozzle screens (Edge DF only).

**MIXING:** When using Edge DF, fill the tank half full with water and begin agitation. Slowly add the required amount of Edge DF. Continue vigourous agitation at all times. Do not add Edge DF over the sump opening as filter plugging may occur.

**INCORPORATION:** Two incorporations required at right angles for thorough mixing. The first incorporation must be done within 24 hours of spraying. When using Edge DF, the second incorporation may be done immediately after the first. When using the granular formulation, delay the second incorporation for 3 days after the first. If applying Edge Granular in the fall, both incorporations must be done in the fall to obtain satisfactory results. See *Herbicide Information* section for additional details on incorporation.

**TANK MIXES:**
- Herbicides: None
- Fertilizers: Edge DF may be tank mixed with liquid fertilizer. Conduct a compatability test before mixing. Edge DF may also be impregnated onto dry bulk fertilizers. See *Herbicide Information* section for details on mixing and spreading.
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: No effect once incorporated.
- Grazing: Do not graze or harvest as forage prior to crop maturity.

- Recropping: Soil residues may affect subsequent crops. See *Table 24* for a list of susceptible crops.
- Storage: Store in a cool, dry place. May be frozen. Do not expose to prolonged heat or prolonged direct sunlight.

**ENVIRONMENTAL PRECAUTIONS:** Poor results can be expected if dry soil conditions prevail between application time and weed emergence.

**COMMENTS:** When using the fall-applied granular formulation, shallow spring tillage (separate from seedbed preparation and prior to seeding) is required to destroy existing weed growth and to warm the soil to activate the herbicide.

### *RIVAL (500 g/L), RIVAL 10 G (10%), TREFLAN EC (545 g/L), TREFLAN QR 5 (5%), TRIFLUREX (400 g/L)*

**WEEDS CONTROLLED:** *See Field Crops Chart.*

Caution: **Trifluralin-resistant green foxtail has developed in Manitoba. Rival, Treflan or Triflurex will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:**

a) Crop Stage: preplant incorporated.
b) Weed Stage: preemergence.

**RATES:**

*Spring Applications*

| PRODUCT | SOIL TYPE | |
|---|---|---|
| | Light soils with less than 6% organic matter | Medium to heavy soils with 6–15% organic matter |
| Rival | 0.65 L/acre | 0.9 - 1.1 L/acre |
| Rival 10 G | 3.4 kg/acre | 4.45 - 5.7 kg/acre |
| Treflan EC | 0.61 L/acre | 0.81 - 1.05 L/acre |
| Treflan QR 5 | 6.9 kg/acre | 8.9 - 11.3 kg/acre |
| Triflurex | 0.81 L/acre | 1.1 L/acre |

*Fall Applications (September 1 to freeze-up):*

| PRODUCT | SOIL TYPE | |
|---|---|---|
| | Light soils with less than 6% organic matter | Medium to heavy soils with 6–15% organic matter |
| Rival 10 G | 4.45 kg/acre* | 5.7 - 6.9 kg/acre |
| Treflan QR 5 | 8.9 kg/acre* | 11.3 - 13.8 kg/acre |

*Application to light textured soils in the fall may predispose fields to wind and water erosion.

The granular formulation is better suited to fall application, the liquid to spring application. Although liquid formulations are registered for fall application this use is not recommended as incorporation requirements may predispose fields to erosion.

**APPLICATION:** Liquid – field sprayer.
Granular – granular applicator.

**WATER VOLUME:** 45 L/acre (liquid product only)

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**INCORPORATION:** Two incorporations required at right angles for thorough mixing. The first incorporation must be completed within 24 hours of spraying. The second incorporation for the liquid may be done immediately after the first. When using the granular delay the second incorporation for 3 days after the first. With fall applications the second incorporation may be delayed until the spring. *See the Herbicide Incorporation* section for additional detail.

**TANK MIXES:**

- Herbicides: None
- Fertilizer: May be applied with liquid fertilizer (eg. 28-0-0) as a carrier. Conduct a compatibility test before mixing. Rival EC or Treflan EC may be impregnated onto dry bulk fertilizer. See *Herbicide Information* section for details.
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: No effect once incorporated.
- Grazing: Do not graze or harvest for livestock feed in the year of treatment.
- Recropping: Rival, Treflan and Triflurex leave a residue in the soil which may affect subsequent crops. *See Table 24* for a list of susceptible crops.
- Storage: Do not freeze. If stored below 5° C bring contents to 15° C for 24 hours and shake well before using.

### *TREFLAN EC (545 g/L) PLUS LEXONE DF (75%), LEXONE L (480 g/L), SENCOR 75 DF (75%) OR SENCOR 500 F (500 g/L)*

**WEEDS CONTROLLED:** *See Field Crops Chart.*

Caution: **Trifluralin-resistant green foxtail has developed in Manitoba. Treflan plus Lexone or Sencor will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:**

a) Crop Stage: preplant incorporated (spring only).
b) Weed Stage: preemergence.

**RATES:** Treflan at 0.61 to 1.05 L/acre tank mixed with one of:
Lexone DF: 0.142 to 0.223 kg/acre
Lexone L/Sencor 500: 0.223 to 0.344 L/acre
Sencor DF: 0.152 to 0.223 kg/acre
Although registered for fall application this use is not recommended as application and in-

corporation requirements will predispose soils to erosion.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles with 50-mesh filters and screens.

**INCORPORATION:** Incorporate twice at right angles as soon as possible after spraying. The first incorporation must be completed within 24 hours after spraying. The second incorporation may be done immediately after the first or at any time prior to seeding. See the *Herbicide Information* section for additional details.

**TANK MIXES:**
- Herbicides: Lexone and Sencor must be applied as a tank mixture with Treflan.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: No effect once incorporated.
- Grazing: Do not graze or harvest as forage in the year of treatment.
- Recropping: Both Treflan and Lexone/Sencor leave residues in the soil which may affect succeeding crops. *See Table 24* for a list of crops susceptible to each product.
- Storage: Do not freeze Treflan, Lexone L or Sencor 500. If stored below 5° C bring contents to 15° C for 24 hours and shake well before using. Lexone DF and Sencor DF may be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Delayed crop development or reduced yield may occur if crop seedlings are stressed by excessive moisture, drought, cold weather, deep planting, or other factors which will result in slow emergence. Injury will be greatest in soils with pH values above 7.4. Poor results will occur if dry conditions prevail between application and weed emergence.

**COMMENTS:** After harvest tillage practices that provide soil mixing may be helpful in reducing the chance of injury to subsequent crops.

## *CARBYNE 2 EC (240 g/L)*

**WEEDS CONTROLLED:** wild oats

**APPLICATION TIMING:**
a) Crop Stage: No restriction on crop stage.
b) Weed Stage: 2 leaf stage but no later than 14 days following emergence.

**RATES:** 0.6 to 0.7 L/acre

Use the higher rate when wild oat density is 4 plants per square foot (40 plants per square meter) or more, when wild oats are not actively growing, or when wild oats have been injured by frost or wind.

**WATER VOLUME:** 18 L/acre

**PRESSURE:** 310 kPa (45 psi)

**NOZZLES:** Teejet 650067, 730067, 800067
Delavan LF.67-65, LF.77-73, LF.67-80
Spray Jet 65.067, TK.75, D.75
Direct spray 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Carbyne and other herbicides.

**RESTRICTIONS:**
- Rainfall: Within 15 minutes will reduce control.
- Grazing: Do not graze or harvest as forage within 35 days of treatment.
- Recropping: No restrictions the year after application.
- Storage: May be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Do not apply to wild oats wet with dew or rain. Performs best under cool, moist growing conditions.

**COMMENTS:** Due to the very narrow application timing and the need for strong crop competition for satisfactory control, opportunities for successful use of Carbyne are limited. For heavy infestations or variable leaf stages of wild oats use of an alternative wild oat herbicide is recommended.

## *BASAGRAN (480 g/L)*

**WEEDS CONTROLLED:** See rate table below.

**APPLICATION TIMING:**
a) Crop Stage: At least 4 inches (10 cm) tall.
b) Weed Stage: Apply when weeds are at the height recommended in the table below.

**RATES:**

| Weeds | Rate of Basagran when weeds listed below are within the recommended treatment height | | | |
|---|---|---|---|---|
| | 0.71 L/acre | | 0.91 L/acre | |
| | inches | (cm) | inches | (cm) |
| **Annual Weeds** | | | | |
| Black nightshade | | | 0.2 - 0.7 | (0.5 - 1.8) |
| Cocklebur | 3 - 7 | (7.5 - 17.5) | 7 - 12 | (17.5 - 30.5) |
| Common chickweed | apply 1 to 3 weeks after chickweed emergence | | | |
| Common groundsel | | | 2 - 4 | ( 5.0 - 10.0) |
| Common ragweed | | | 1 - 2 | ( 2.5 - 5.0) |
| Corn spurry | | | 1 - 4 | ( 2.5 - 10.0) |
| Hairy galinsoga | | | 2 - 3 | ( 5.0 - 7.5) |
| Lady's thumb | 1 - 3 | ( 2.5 - 7.5) | 3 - 8 | ( 7.5 - 20.0) |
| Lamb's quarters | | | 0.5 - 1.0 | ( 1.3 - 2.5) |
| Purslane | | | 1 - 2 | ( 2.5 - 5.0) |
| Red root pigweed | | | 0.5 - 1.25 | ( 1.3 - 3.2) |
| Russian thistle | | | 1 - 3 | ( 2.5 - 7.5) |
| Venice mallow | 1 - 2 | ( 2.5 - 5.0) | 2 - 4 | ( 5.0 - 10.0) |
| Wild mustard | 1 - 5 | ( 2.5 - 12.5) | 5 - 10 | (12.5 - 25.0) |
| **Perennial Weeds** | – repeat application 7 to 10 days after first application | | | |
| Canada thistle | 6 - 8 | (15 - 20 ) | more than 8 | (more than 20) |
| Yellow nutsedge | 6 - 8 | (15 - 20 ) | more than 8 | (more than 20) |

### Fababeans

**ADDITIVES:** Add Assist Oil Concentrate at 0.5 to 1.0 L per 100 L spray mixture. If hot, humid conditions prevail (above 28° C and 80% relative humidity) use only the low rate of Assist Oil Concentrate.

**WATER VOLUME:** 80 to 160 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles capable of delivering high water volumes. Direct nozzles 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Basagran and other herbicides.

**RESTRICTIONS:**
- Rainfall: Within 8 hours will reduce control.
- Grazing: Do not graze or harvest as forage in the year of treatment.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Poor results will occur if temperatures are cool. Apply only if daytime temperatures will exceed 21° C.

**COMMENTS:** Use at least 80 L/acre water to ensure thorough coverage with this contact herbicide. Top growth of thistles will be burnt off but rapid regrowth can be expected.

## *HOE-GRASS 284 (284 g/L)*

**WEEDS CONTROLLED:** *See Field Crops Chart.*

**APPLICATION TIMING:**

a) Crop Stage: No leaf restrictions but do not apply within 60 days of harvest.

b) Weed Stage: Wild oats, foxtail and barnyard grass 1 to 4 leaf stage and prior to tillering; Persian darnel 1 to 3 leaf stage; volunteer corn 6 to 10 inches (15 to 25 cm) in height.

**RATES:** 1.42 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** 80° flat fan directed 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days after application of Hoe-Grass 284 before applying other herbicides or fertilizers.

**RESTRICTIONS:**
- Preharvest: Do not apply within 60 days of harvest.
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or harvest as forage during the year of application.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Applications under hot (above 27° C) or droughty conditions will result in reduced weed control.

**COMMENTS:** Hoe-Grass provides optimum results under cool, moist growing conditions and should be applied when the majority of the grassy weeds are in the 2 to 3 leaf stage for best results. Although registered for application up to the 5 leaf stage of wild oats, results at this late leaf stage are not consistent and this use is not recommended.

## *POAST (184 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: No leaf stage restrictions but do not apply within 80 days of harvest.

b) Weed Stage: Annual weeds 2 to 5 leaf stage. Quackgrass 1 to 3 leaf stage.

**RATES:**

| WEED | RATE (L/acre) WITH ASSIST | RATE (L/acre) WITH MERGE |
|---|---|---|
| green or yellow foxtail, barnyard grass, proso millet, witchgrass and volunteer corn | 0.324 - 0.405 | 0.324 - 0.405 |
| wild oats | 0.57 - 0.65 | 0.57 - 0.65 |
| volunteer oats and wheat | 0.65 | 0.57 - 0.65 |
| volunteer barley | 0.77 | 0.57 - 0.65 |
| quackgrass suppression | 1.78 | 1.1 |

Where a rate range is specified for a weed, use the higher rate to control heavy infestations.

**ADDITIVES:** Add Assist Oil Concentrate or Merge at 1 L per 100 L spray solution for annual weeds or at 2 L per 100 L spray solution for quackgrass. Merge will provide more consistent annual grass control than Assist.

**WATER VOLUME:** 25 to 80 L/acre. Apply at least 45 L/acre if crop or weed growth is dense and when spraying quackgrass.

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Stainless steel flat fan directed 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Poast and application of other herbicides or fertilizers.

**RESTRICTIONS:**

- Preharvest: Do not apply within 80 days of harvest.
- Rainfall: Within 1 hour of application will reduce control.
- Grazing: Do not graze or harvest for forage prior to crop maturity.
- Recropping: A cultivation to a 4 inch (10 cm) depth is required 7 days prior to re-seeding Poast-treated fields to grass crops such as corn, cereals or forage grasses in the year of treatment. Allow a minimum of 14 days between application of Poast and seeding of grass crops.
- Storage: May be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Control will be reduced if weeds are not actively growing due to drought, flooding, or prolonged cool (15° C or cooler) periods. Do not apply to grasses stressed for more than 20 days due to lack of moisture.

**COMMENTS:** For quackgrass suppression, rhizomes must be thoroughly fragmented prior to seeding.

# *Flax*

## TABLE 8 SUMMARY OF FLAX RECOMMENDATIONS

Note: The ratings in this chart give general comparisons based on application rates, timing, application instructions and precautions as outlined in this Guide. Where two or more brand names are indicated, the weed may not appear on all labels. See Field Crops Chart for complete weed spectrum.

| HERBICIDE | Crop Tolerance | Barnyard Grass | Foxtail, Green and Yellow | Wild Oats | Buckwheat, Wild | Catchfly, Night Flowering | Chickweed | Cleavers | Cow Cockle | Cocklebur | Flixweed | Hemp Nettle | Kochia | Lamb's Quarters | Mustard, Wild | Pigweed, Red Root | Quackgrass | Russian Thistle | Shepherd's Purse | Smartweed, Annual Species | Stinkweed | Thistle, Sow (Perennial) | Thistle, Canada | Volunteer Barley | Volunteer Wheat |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Avadex BW | E | | | G | | | | | | | | | | | | | | | | | | | | | |
| Basagran | F | | | | | | F | | | F | | | | F | F | P | | | F¹ | F | F¹ | | F³ | | |
| Buctril M | F | | | | E | F | | | G | G | G¹ | | G | E | E | | | G | G¹ | G | G¹ | P² | P² | | |
| Carbyne 2 EC | G | | | P | | | | | | | | | | | | | | | | | | | | | |
| Excel | E | G | G | G | | | | | | | | | | | | | | | | | | | | | |
| Eptam | F | G | G | G | | | G | | | | | | | G | | G | | | | | | | | G | |
| Fortress | G | | G⁶ | G | | | | | | | | | | | | | | | | | | | | F | F |
| Fusilade | E | E | F | G | | | | | | | | | | | | | F² | | | | | | | E | E |
| Hoe-Grass 284 | G | G | G | G | | | | | | | | | | | | | | | | | | | | | |
| Hoe-Grass II | F | G | G | G | G | P | | | G | | | | F | G | F | P | | G | | G | F¹ | | | | |
| MCPA/MCPAK | F | | | | | | | | | G | E¹ | F⁴ | | E | E | | | | E¹ | | E¹ | P² | P² | | |
| Poast | E | E | E | E | | | | | | | | | | | | | F² | | | | | | | G | G |
| Poast + Buctril M | F | G | G | G | E | F | | | G | G | G¹ | | G | E | E | | F² | G | G¹ | G | G¹ | P² | P² | G | G |
| Poast + MCPA amine or ester | F | G | G | G | | | | | | G | E¹ | | | E | E | | | | E¹ | | E¹ | P² | P² | G | G |
| Rival/Treflan | F | G | G⁶ | F | F | | G | | G | | | | | G | | G | | G⁵ | | | | | | | |
| Stampede 360 + MCPA ester | F | | G | | G | | | | | | G¹ | | F | G | G | G | | | G¹ | G | G¹ | | | | |
| Stampede CM | F | | G | | G | | | | | | G¹ | | F | G | G | G | | | G¹ | G | G¹ | | | | |
| TCA | G | | F | | | | | | | | | | | | | | | | | | | | | | |
| TCA + MCPA | F | | F | | | | | | | G | E¹ | F⁴ | | E | E | | | | E¹ | | E¹ | P² | P² | | |

**LEGEND**

| | Crop Tolerance | Weed Control |
|---|---|---|
| E — Excellent | Consistently exhibits a high degree of tolerance over a wide range of growing conditions. | Consistently provides a high degree of control over a wide range of growing conditions. |
| G — Good | Exhibits acceptable crop tolerance under most growing conditions. | Provides acceptable control under most growing conditions. |
| F — Fair | Tolerance is variable depending on growing conditions. | Control is variable depending on growing conditions. |
| P — Poor | Tolerance is often unacceptable. | May provide some suppression but control is often unacceptable. |

[1] Spring seedlings only. Overwintered rosettes will not be controlled.
[2] Top growth only, regrowth can be expected.
[3] Split applications required for acceptable control.
[4] MCPAK only
[5] Rival only
[6] Will not control trifluralin resistant foxtail

## Preplant Incorporated

**Manitoba Agriculture does not recommend fall application of soil incorporated herbicides to soils which are subject to wind or water erosion. Fall application to summerfallow fields or to soils with light trash cover or to light textured soils may predispose the field to erosion by wind and water and is not recommended.**

### AVADEX BW ([illegible] g/L), AVADEX BW GRANULAR (10%)

**APPLICATION TIMING:**

a) Crop Stage: preplant incorporated.
b) Weed Stage: preemergence.

**RATES:**

| PRODUCT | ORGANIC MATTER | | |
|---|---|---|---|
| | Less than 2% | 2 - 4% | Greater than 4% |
| Fall Granular | 5.7 kg/acre | 6.9 kg/acre | 8.9 kg/acre |
| Spring Granular | 6.9 kg/acre | 6.9 kg/acre | 8.9 kg/acre |
| Fall Liquid* | not recommended | not recommended | not recommended |
| Spring Liquid | 1.72 L/acre | 1.72 L/acre | 2.23 L/acre |

* Although registered for fall application, the application and incorporation requirements for the liquid formulation predisposes soils to erosion and its use in the fall is not recommended.

**APPLICATION:** Liquid — field sprayer
Granular — granular applicator

**WATER VOLUME:** 45 L/acre (liquid product only).

**PRESSURE:** 200 kPa (30 psi)

**NOZZLES:** Flat fan.

**INCORPORATION:** Two incorporations at right angles required for thorough mixing. The first incorporation should be completed as soon as possible on the day of spraying (liquid product) or within 48 hours of application (granular product). The second incorporation for the liquid may be done immediately after the first. For best results with the granular product delay the second incorporation at least 3 to 5 days. *Refer to Herbicide Incorporation section* for detailed incorporation instructions.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: Avadex BW liquid may be applied using liquid fertilizer as a carrier (conduct a compatability test before mixing), or sprayed on dry urea fertilizer (*refer to Herbicide Incorporation section* for mixing and spreading instructions).
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Moisture is required for activation. Rainfall of at least 0.6 inches (1.5 cm) within 2 weeks of application is required for optimum results.
- Grazing: Do not graze or harvest as forage during the year of application.
- Recropping: Will damage domestic oats seeded within 21 months of application.
- Storage: Do not freeze the liquid. The granular may be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Very dry soil conditions in spring or prolonged cool soil temperatures at time of wild oat germination will result in reduced control.

**COMMENTS:** Poor results may be expected from incomplete incorporation due to wet, cloddy soil or heavy trash. Ridges left by seeding may disrupt the treated layer and allow escapes. Spring application of the liquid formulation generally provides a higher level of control than does the granular formulation applied in the spring.

## *EPTAM 8-E (800 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: preplant incorporated (spring only).
b) Weed Stage: preemergence.

**RATE:** 1.42 to 1.72 L/acre

Use the higher rate for quackgrass suppression.

Although registered for fall application, use of Eptam in the fall is not recommended as the application and incorporation requirements predispose soils to wind and water erosion.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 200 kPa (40 psi)

**NOZZLES:** Flat fan.

**INCORPORATION:** Incorporate immediately (within minutes) of application. Incorporate twice at right angles. *See Herbicide Information section* for detailed incorporation instructions.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: May be applied using liquid fertilizer as a carrier (conduct a compatability test before mixing) or sprayed on dry bulk fertilizers (except ammonium nitrate). *Refer to Herbicide Incorporation section* for mixing and spreading instructions.
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Do not apply to a wet soil surface.
- Grazing: Do not graze or harvest as forage.
- Recropping: No restrictions the year after application.
- Storage: May be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Apply to a dry soil surface only. Crop injury can occur if stressful environmental conditions (cold, wet soils, drought or excessive heat) prevail at time of application or during crop emergence.

**COMMENTS:** Eptam is a very volatile herbicide. The first incorporation should be done as part of the spraying operation to reduce vapour losses.

## *FORTRESS (14%)*

**Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Fortress will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:**
a) Crop Stage: preplant incorporated in fall between September 15 and freeze-up or in the spring prior to sowing the crop.
b) Weed Stage: preemergence.

**RATES:**

| | Rate (kg/acre) | |
|---|---|---|
| **Organic Matter** | **Spring** | **Fall** |
| Less than 4% | 5.67 | 5.67 |
| 4 - 6% | 6.88 | 5.67 |
| Greater than 6% | 6.88 | 6.88 |

**APPLICATION:** Apply with a calibrated granular applicator.

**INCORPORATION:** Incorporate twice at right angles, no deeper than 2 inches (5 cm). First incorporation must be done within 24 hours of application. If using fall application, second incorporation may be delayed until spring, or may be performed 3 to 5 days after the first incorporation. If using spring applications, delay the second incorporation 3 to 5 days after the first incorporation. Refer to *Herbicide Information* section for detailed incorporation instructions.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Moisture is required for activation. Rainfall of at least 0.6 inches (1.5 cm) within 2 weeks of seeding crop is required to ensure optimum results.
- Grazing: Do not graze or harvest for forage.
- Recropping: Fortress will leave a residue in the soil. Oats, sugar beets, and small seeded forage grasses may be injured if planted within 24 months of application.
- Storage: Store in a cool, dry place. May be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Crop injury can occur on fields where Fortress has been applied and heavy rainfall or cold weather occur after seeding but prior to crop emergence. Shallow seeding into a firm seed bed under warm soil conditions (10° C or warmer) will promote rapid crop germination and emergence and will reduce the risk of crop injury. Very dry conditions in the spring or prolonged cold soil temperatures at the time of weed germination will result in reduced control.

**COMMENTS:** Poor results can be expected from incomplete incorporation due to wet, cloddy soil or surface trash. Ridges left at seeding may disrupt the treated layer and allow weed escapes.

### *RIVAL 10 G (10%), TREFLAN QR 5 (5%)*

**Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Rival or Treflan will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:**
a) Crop Stage: preplant incorporated in the fall after September 1 and before freeze-up.
b) Weed Stage: preemergence.

**RATES:**

| PRODUCT | SOIL TYPE | |
|---|---|---|
| | Light soils with less than 6% organic matter | Medium to heavy soils with 6–15% organic matter |
| Rival 10 G | 4.45 kg/acre* | 5.7 – 6.9 kg/acre |
| Treflan QR 5 | 8.9 kg/acre* | 11.3 – 13.8 kg/acre |

*Application to light textured soils in the fall may predispose fields to wind and water erosion.

Where a rate range is specified use the heavier rate where heavy infestations of wild oats are expected.

Although registered for fall application, the application and incorporation requirements for liquid formulations predispose soils to erosion and their application in the fall is not recommended.

**APPLICATION:** Use a calibrated granular applicator.

**INCORPORATION:** Two incorporations at right angles are required for thorough mixing. The first incorporation must be completed within 24 hours of application. The second incorporation should be delayed for at least 3 days after the first. The second incorporation may be delayed until the spring. *See the Herbicide Information section* for additional incorporation instructions.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: No effect once incorporated.
- Grazing: Do not graze or harvest for forage.
- Recropping: Rival and Treflan leave a residue in the soil which may affect subsequent crops. *See Table 24* for a list of susceptible crops.
- Storage: Store in a cool, dry place. May be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Injury to flax may occur if soil conditions are not conducive to rapid flax emergence. To minimize crop injury, cultivate shallowly in the spring and seed the crop into a moist, packed seed bed no more than 1.5 inches (4 cm) deep using a hoe drill or press drill. Do not seed when soil condition is cold (generally, seeding should commence no earlier than May 15).

**COMMENTS:** Do not apply in spring as severe crop injury may result. Poor results will occur if dry conditions prevail prior to weed emergence. Shallow tillage in the spring is required to destroy existing weed growth and to warm the soil to activate the herbicide.

## Postemergence

### *BAR-FUX and TCA*

### *BASAGRAN (480 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: At least 2 inches (5 cm) tall.
b) Weed Stage: Apply when weeds are at the height recommended in the rate table below.

**RATES:**

| Weeds | Rate of Basagran when weeds listed below are within the recommended treatment height | | | |
|---|---|---|---|---|
| | 0.71 L/acre | | 0.91 L/acre | |
| | inches | (cm) | inches | (cm) |
| **Annual Weeds** | | | | |
| Black nightshade | | | 0.2 – 0.7 | (0.5 – 1.8) |
| Cocklebur | 3 – 7 | (7.5 – 17.5) | 7 – 12 | (17.5 – 30.5) |
| Common chickweed | apply 1 to 3 weeks after chickweed emergence | | | |
| Common groundsel | | | 2 – 4 | ( 5.0 – 10.0) |
| Common ragweed | | | 1 – 2 | ( 2.5 – 5.0) |
| Corn spurry | | | 1 – 4 | ( 2.5 – 10.0) |
| Hairy galinsoga | | | 2 – 3 | ( 5.0 – 7.5) |
| Lady's thumb | 1 – 3 | (2.5 – 7.5) | 3 – 8 | ( 7.5 – 20.0) |
| Lamb's quarters | | | 0.5 – 1.0 | ( 1.3 – 2.5) |
| Purslane | | | 1 – 2 | ( 2.5 – 5.0) |
| Red root pigweed | | | 0.5 – 1.25 | ( 1.3 – 3.2) |
| Russian thistle | | | 1 – 3 | ( 2.5 – 7.5) |
| Venice mallow | 1 – 2 | (2.5 – 5.0) | 2 – 4 | ( 5.0 – 10.0) |
| Wild mustard | 1 – 5 | (2.5 – 12.5) | 5 – 10 | (12.5 – 25.0) |
| **Perennial Weeds** | – repeat application 7 to 10 days after first application | | | |
| Canada thistle | 6 – 8 | (15 – 20 ) | more than 8 | (more than 20) |
| Yellow nutsedge | 6 – 8 | (15 – 20 ) | more than 8 | (more than 20) |

**ADDITIVES:** Add Assist Oil Concentrate at 0.5 to 1.0 L per 100 L spray mixture. If hot, humid conditions prevail (above 28° C and 80% humidity) use only the lower rate of Assist.

**WATER VOLUME:** 80 to 160 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles capable of delivering high water volumes.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Basagran and other herbicides.

**RESTRICTIONS:**
- Rainfall: Within 8 hours will reduce control.
- Grazing: Do not graze or harvest as forage.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Poor results will occur if temperatures are cool. Apply only if day time temperatures will exceed 21° C.

**COMMENTS:** Use at least 80 L/acre water to ensure thorough coverage with this contact herbicide. Top growth of thistles will be burnt off but rapid regrowth should be expected.

## *BUCTRIL M (560 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: 2 to 4 inches (5 to 10 cm) in height.
b) Weed Stage: 2 to 4 leaf stage.

**RATE:** 0.405 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**
- Herbicides: May be tank mixed with Poast but do not tank mix with Poast Power Pack.
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Buctril M and other herbicides or fertilizers.

**RESTRICTIONS:**
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or harvest for forage.
- Recropping: No restrictions the year after application.
- Storage: May be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Do not apply if day time temperatures are expected to exceed 27° C within 48 hours before or after application as severe crop injury may occur. Prolonged cool growing conditions may result in reduced weed control.

**COMMENTS:** Because this is a contact herbicide poor results will occur if there is poor spray coverage. Weeds beyond the 4 leaf stage may outgrow the effects of the herbicide. Top growth of Canada thistle will be burnt off but there will be little effect on the root so rapid regrowth can be expected.

## *CARBYNE 2 EC (240 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: No restrictions on crop stage.
b) Weed Stage: 2 leaf stage and no later than 14 days following emergence.

**RATES:** 0.61 to 0.71 L/acre
Use the higher rate when wild oat density is 4 plants per square foot (40 plants per square metre) or more, when wild oats are not actively growing, or when wild oats have been injured by frost or wind.

**WATER VOLUME:** 18 L/acre

**PRESSURE:** 300 kPa (45 psi)

**NOZZLES:** Teejet 650067, 730067, 800067
Delavan LF.67-65, LF.77-73, LF.67-80
Spray Jet 65.067, TK.75, D.75
Direct spray 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Carbyne and other herbicides.

**RESTRICTIONS:**
- Rainfall: Do not apply when crop is wet with dew or rain. Rainfall within 15 minutes will reduce control.

- Grazing: Do not graze or harvest for forage.
- Recropping: No restrictions the year after application.
- Storage: May be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Performs best under cool, moist weather conditions. Under adverse growing conditions control will be severely reduced.

**COMMENTS:** Due to the very narrow application timing and the need for strong crop competition for satisfactory control, opportunities for successful use of Carbyne are limited. For heavy infestations or variable leaf stages of wild oats use of an alternative herbicide is recommended.

## EXCEL (90 g/L)

**APPLICATION TIMING:**

a) Crop Stage: No leaf stage restriction but do not apply within 60 days of harvest.

b) Weed Stage: Wild oats, foxtail, barnyard grass, and volunteer barley 1 to 4 leaf stage (Do not apply if total leaf number, including tillers, exceeds six); volunteer corn 2 to 10 inches (5 to 25 cm) tall.

**RATE:** 1.01 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Stainless steel 80° or 110° flat fan nozzles directed 45° forward.

**TANK MIXES:**

- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Excel and other herbicides.

**RESTRICTIONS:**

- Preharvest: Do not apply within 60 days of harvest.
- Rainfall: Within 3 hours of application will reduce control.
- Grazing: Do not graze or harvest as forage.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Poor weed control will occur if prolonged cool (12° C or cooler) or very hot (28° C or warmer) temperatures prevail. Low relative humidity and dry soil conditions will also reduce control. Control of weeds which have tillered are particularly liable to escape under these conditions.

**COMMENTS:** Excel does not suppress quackgrass.

## [illegible]

**APPLICATION TIMING:**

a) Crop Stage: No leaf restriction but do not apply within 80 days of harvest.

b) Weed Stage: 2 to 4 leaf stage except 2 to 5 leaf stage of volunteer corn and 3 to 5 leaf stage of quackgrass. Do not apply after tillering of annual grass weeds.

**RATES:**

| WEED | LEAF STAGE | RATE (L/acre) |
|---|---|---|
| volunteer corn | 2 - 5 | 0.243 |
| barnyard grass, volunteer wheat, volunteer barley | 2 - 4 | 0.324 |
| wild oats, proso millet | 2 - 4 | 0.405 |
| green and yellow foxtail | 2 - 4 | 0.57 |
| quackgrass suppression | 3 - 5<br>but less than 8 inches (20 cm) tall | 0.81 |

**ADDITIVES:** Add Agral 90 at a rate of 0.1 L per 100 L of spray solution.

**WATER VOLUME:** 45 to 130 L/acre

Use the higher water volume with heavy crop canopies or dense weed infestations.

**PRESSURE:** 200 to 275 kPa (30 to 40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**

- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 3 days between application of Fusilade and other herbicides. Fusilade must be applied first.

**RESTRICTIONS:**

- Preharvest: Do not apply within 80 days of harvest.
- Rainfall: Within 2 hours will reduce control.
- Grazing: Do not graze or harvest as forage.
- Recropping: Do not sow cereals, corn, or forage grasses within 60 days of application.
- Storage: May be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Reduced control will occur if grasses are under stress due to drought, flooding or excessively cool conditions.

**COMMENTS:** Experimental studies have shown that the active ingredient in this product may cause birth defects in laboratory animals. Women capable of bearing children should avoid contact with this product. For quackgrass suppression ensure that rhizomes are thoroughly fragmented by spring tillage prior to seeding. Quackgrass plants more than 8 inches (20 cm) in height or which have reached the heading stage will not be controlled. Control will be reduced under hot or dry weather conditions.

## [illegible]

**APPLICATION TIMING:**

a) Crop Stage: No leaf stage restriction but do not apply within 60 days of harvest.

b) Weed Stage: Wild oats, foxtail and barnyard grass 1 to 4 leaf stage and prior to tillering; Persian darnel 1 to 3 leaf stage; volunteer corn 6 to 10 inches (15 to 25 cm) in height. Although registered for application up to the 5 leaf stage of wild oats, results at this late stage are inconsistent and this use is not recommended.

**RATE:** 1.01 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** 80° flat fan directed 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: Decis

Allow 4 days between application of Hoe-Grass 284 and other herbicides or fertilizers.

**RESTRICTIONS:**
- Preharvest: Do not apply within 60 days of harvest.
- Rainfall: Within 1 hour of application will reduce control.
- Grazing: Do not graze or harvest as forage.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Application under hot (above 27° C) or droughty conditions will result in reduced weed control.

**COMMENTS:** Hoe-Grass provides optimum results under cool, moist conditions and should be applied when the majority of the grassy weeds are in the 2 to 3 leaf stage for best results.

## *HOE-GRASS II (310 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: 2 to 4 inches (5 to 10 cm) in height.

b) Weed Stage: Wild oats, foxtail and barnyard grass 1 to 4 leaf stage and before tillering; Persian darnel 1 to 3 leaf stage; volunteer corn 6 to 10 inches (15 to 25 cm) tall; wild mustard up to 3 leaf stage; Russian thistle up to 2 inches (5 cm) in height; and other broadleaf weeds up to the early 4 leaf stage.

**RATE:** 1.42 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** 80° flat fan nozzles directed 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow a 4 day interval between application of Hoe-Grass II and other herbicides. Apply Hoe-Grass II first.

**RESTRICTIONS:**
- Preharvest: Do not apply within 60 days of harvest.
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or harvest as forage.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Application under hot (above 27° C) or dry conditions will result in reduced weed control. Application during periods when day time temperatures exceed 27° C will cause severe crop injury.

**COMMENTS:** Because this is a contact herbicide, thorough spray coverage is essential. Best results are obtained from early applications (2 to 3 leaf stage of grassy and broadleaf weeds). Moderate day time temperatures (18° to 24° C) and good moisture conditions provide optimum results. If wild mustard is beyond the 3 leaf stage, if grassy and broadleaf weeds are not all in the correct stage for application, or if the crop or weeds are stressed by adverse environmental conditions do not apply Hoe-Grass II.

## *MCPA AMINE, ESTER, SODIUM POTASSIUM SALT MIXTURES OR SODIUM SALTS*

**APPLICATION TIMING:**

a) Crop Stage: 2 inches (5 cm) in height to prebud stage.

b) Weed Stage: 2 to 4 leaf stage.

**RATES:** 0.51 to 0.69 L/acre of MCPA formulations containing 500 g/L. Use the higher rates under dry or cool weather conditions, for heavy weed infestations or for top growth suppression of Canada thistle. For product volumes of other MCPA formulations *refer to Table 21.*

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**
- Herbicides: MCPA amine may be tank mixed with Poast plus Assist, Poast plus Merge, or NaTA TCA. MCPA ester may be mixed with Poast plus Assist or Poast plus Merge.
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of MCPA and other herbicides.

**RESTRICTIONS:**
- Rainfall: Within 6 hours of MCPA Sodium Salt, 4 hours of MCPA amine or 2 hours of MCPA ester application will reduce control.
- Grazing: Do not graze or harvest as forage.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** To avoid crop injury do not spray if temperatures exceed 27° C.

**COMMENTS:** Crop injury and a delay in crop maturity may result from use of the highest recommended rates. If only wild mustard, lamb's quarters and spring seedlings of stinkweed or flixweed are present the rate of MCPA (500 g/L) can be reduced to 0.34 L/acre. Extremely hard water may reduce performance or cause spraying problems.

## *MCPAK (400 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: 2 to 4 inches (5 to 10 cm) in height.
b) Weed Stage: 2 to 4 leaf stage.

**RATES:** 0.85 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**
- Herbicides: May be tank mixed with TCA.
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of MCPAK and other herbicides.

**RESTRICTIONS:**
- Rainfall: Within 6 hours of application will reduce control.
- Grazing: Do not graze or harvest as forage.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Crop injury and a delay in maturity may result from application under hot or humid conditions. Do not apply if temperature exeeds 27° C.

**COMMENTS:** Extremely hard water may reduce performance or cause spraying problems.

## *NaTA TCA see TCA*

## *POAST (184 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: No leaf stage restriction but do not apply within 60 days of harvest.
b) Weed Stage: Annual weeds 2 to 5 leaf stage. Quackgrass 1 to 3 leaf stage.

**RATES:**

| WEED | RATE (L/acre) WITH ASSIST | RATE (L/acre) WITH MERGE |
|---|---|---|
| green or yellow foxtail, barnyard grass, proso millet, witchgrass and volunteer corn | 0.324 – 0.405 | 0.324 – 0.405 |
| wild oats | 0.57 – 0.65 | 0.57 – 0.65 |
| volunteer wheat and oats | 0.65 | 0.57 – 0.65 |
| volunteer barley | 0.65 – 0.77 | 0.57 – 0.65 |
| quackgrass suppression | 1.78 | 1.1 |

Where a rate range is specified for a weed use the higher rate to control heavy infestations.

**ADDITIVES:** Add Assist Oil Concentrate or Merge at 1 L per 100 L spray solution for annual weeds or at 2 L per 100 L spray solution for quackgrass. The use of Merge will provide more consistent annual grass control than use of Assist.

**WATER VOLUME:** 25 to 80 L/acre
Apply at least 45 L/acre if crop or weed growth is dense and when spraying quackgrass.

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Stainless steel 80° flat fan directed 45° forward.

**TANK MIXES:**
- Herbicides: Poast at 0.324 to 0.77 L/acre may be tank mixed with Buctril M, MCPA ester or MCPA amine.
- Fertilizer: See Poast Power Pack recommendation for information on mixtures with ammonium sulphate.
- Insecticides: None

Allow 4 days between application of Poast and other herbicides.

**RESTRICTIONS:**
- Preharvest: Do not apply within 60 days of harvest.
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or harvest as forage.
- Recropping: A cultivation to a 4 inch (10 cm) depth is required 7 days prior to re-seeding Poast-treated fields to grass crops (such as corn, cereals or forage grasses) in the year of treatment. Allow a minimum of 14 days between application of Poast and seeding of grass crops.
- Storage: May be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Control will be reduced if weeds are not actively growing due to drought, flooding or prolonged cool (15° C or cooler) periods. Do not apply if grassy weeds have been stressed for more than 20 days due to lack of moisture.

**COMMENTS:** For quackgrass suppression, rhizomes must be thoroughly fragmented prior to seeding. Tank mixtures may result in reduced weed control or increased crop injury. To reduce the risk of crop injury do not apply tank mixtures during hot (greater than 27° C) or humid weather. Apply tank mixtures in the evening for improved crop safety. Reductions in grassy weed control as a result of tank mixing will be greater with amine formulations than with ester formulations of MCPA and will be most evident with lower rates of Poast. Tank mixes with Buctril M must be applied before broadleaf weeds are past the 4 leaf stage for satisfactory control. If broadleaved weeds and grasses are not both in the recommended treatment stage at the same time separate applications should be made.

## POAST (184 g/L) + POWER PACK [AMMONIUM SULPHATE (490 g/L) AND ASSIST OIL CONCENTRATE]

**APPLICATION TIMING:**

a) Crop Stage: No leaf stage restriction but do not apply within 60 days of harvest.

b) Weed Stage: 2 to 5 leaf stage of annual grass weeds; 1 to 3 leaf stage of quackgrass.

**RATE:** 0.57 L/acre Poast for annual grasses
1.1 L/acre Poast for quackgrass

**ADDITIVES:** Add 1.62 L/acre Ammonium Sulphate and Assist Oil Concentrate at 1 L per 100 L spray solution. For quackgrass suppression the rate of Assist Oil Concentrate may be increased to 2 L per 100 L spray solution.

**MIXING:** To mix, partially fill the tank with water, slowly add the Ammonium Sulphate, then add the Poast and finally, the Assist Oil Concentrate. Maintain agitation during mixing.

**WATER VOLUME:** 25 to 80 L/acre
Use the higher water volumes for heavy weed infestations or when applying to quackgrass.

**NOZZLES:** Flat fan directed 45° forward.

**TANK MIXES:**

- Herbicides: None
- Fertilizer: Mix only with technical grade ammonium sulphate at rates specified above.
- Insecticides: None

Allow 4 days between application of Poast Power Pack and other herbicides or fertilizers.

**RESTRICTIONS:**

- Preharvest: Do not apply within 60 days of harvest.
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or harvest as forage.
- Recropping: A cultivation to a 4 inch (10 cm) depth is required 7 days prior to re-seeding Poast-treated fields to grass crops (such as corn, cereals or forage grasses) in the year of treatment. Allow a minimum of 14 days between application of Poast and seeding of grass crops.
- Storage: Poast may be frozen but do not store ammonium sulphate at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Control will be reduced if weeds are not actively growing due to drought, flooding or prolonged cool periods (15° C or cooler). Do not apply to grasses stressed for more than 20 days due to lack of moisture.

**COMMENTS:** Since Ammonium Sulphate is corrosive do not allow spray mixture to stand and thoroughly clean sprayer after use. Optimum results are obtained under warm moist conditions. Do not tank mix Poast + Power Pack with broadleaf herbicides as severe injury to flax will result. For quackgrass suppression ensure that rhizomes are thoroughly fragmented by spring tillage prior to seeding.

## STAMPEDE 360 (360 g/L) PLUS MCPA ESTER, STAMPEDE CM (480 g/L)

**APPLICATION TIMING:**

a) Crop Stage: 2 to 5 inches (5 to 12 cm) in height.

b) Weed Stage: Foxtail 1 to 4 leaf stage with the majority in the 3 leaf stage and less than 1 inch (2.5 cm) tall; broadleaved weeds 2 to 4 leaf stage.

**RATES:** Stampede CM – 1.11 L/acre
Stampede 360 at 1.11 L/acre plus MCPA ester (500 g/L) at 0.223 L/acre. For product volumes of other MCPA ester formulations *see Table 21.*

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles with 50-mesh screens.

**MIXING:** Partially fill the spray tank with water which is 10° C or warmer. If using Stampede CM, add the product with the agitation running. If using Stampede 360 + MCPA, add the MCPA to the tank, continue filling, then add the Stampede 360. Do not leave spray solution standing overnight.

**TANK MIXES:**

- Herbicides: Stampede 360 should be applied as a tank mixture with MCPA ester.
  Stampede CM – no tank mixes recommended.
  Allow 3 days between application of Stampede 360 or Stampede CM and other herbicides. Do not apply Stampede to crops grown in fields in which atrazine or other triazine herbicides (for example Lexone, Sencor, Blagal, Bladex, Marksman, Laddok, Simadex or Princep) have been ap-

plied until soil analysis confirms that the triazine residues have completely disappeared.

- Fertilizer: None
- Insecticides: None. Allow 14 days between application of Stampede and Dimethoate (Cygon) or Malathion insecticides. Decis may be applied at any time before or after Stampede application. Do not spray other insecticides the same season as Stampede applications.

**RESTRICTIONS:**

- Rainfall: Within 4 hours will reduce control.
- Grazing: Do not graze or harvest for forage.
- Recropping: No restrictions the year after application.
- Storage: Do not store at temperatures below -9° C.

**ENVIRONMENTAL PRECAUTIONS:** Do not spray when temperatures are below 10° C or when day time high temperatures will exceed 30° C as severe crop injury will occur. Do not apply if crop is recovering from frost damage or if frost is expected within 24 hours. Crops damaged by winds should be fully recovered before applying Stampede 360 or Stampede CM. Best weed control is obtained when relative humidity is high and daily maximum temperatures exceed 21° C. Poor control can be expected if top soil is dry to a depth of 2 inches (5 cm) or more.

**COMMENTS:** Stampede is a contact herbicide and thorough spray coverage is required for best results. Early application (2 to 3 leaf stage of foxtail) is essential. Stampede will not control foxtail or broadleaf weeds that emerge after application. Stampede 360 is also registered for application without MCPA but the spectrum of broadleaved weeds controlled and effectiveness of green foxtail control will be reduced.

Leaf discoloration and burn may occur on the crop, particularly under hot, dry conditions. Under these conditions early morning or evening spraying is recommended.

Stampede may be applied using "Floater" spray equipment provided 70 L/acre spray volume and flat fan nozzles are used. Application by aircraft or Spra-Coupe is not recommended.

## [illegible]

**APPLICATION TIMING:**

a) Crop Stage: 4 to 6 inches (10 to 15 cm) tall
b) Weed Stage: 1 to 2 leaf stage.

**RATES:** 1.81 kg/acre

**WATER VOLUME:** 45 to 60 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Stainless steel flat fan nozzles with 50-mesh screens.

**TANK MIXES:**

- Herbicides: NaTA TCA can be mixed with MCPA amine. Bar-fox can be tank mixed with Estemine MCPA.
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of TCA and other herbicides.

**RESTRICTIONS:**

- Rainfall: A light rain after application is beneficial for herbicide activation.
- Grazing: Do not graze treated areas for at least 24 hours.
- Recropping: No restrictions the year after application.
- Storage: Bar-fox and NaTA TCA should be kept in a cool, dry storage and may be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Since TCA acts primarily through the soil there will be variations in control depending on soil moisture conditions. Control will be poor if surface soils are dry.

**COMMENTS:** Control of foxtail with TCA depends on strong crop competition. For heavy infestations of green foxtail, use of alternative herbicides is recommended.

Special Crops

## TABLE 9 SUMMARY OF LENTIL RECOMMENDATIONS

Note: The ratings in this chart give general comparisons based on application rates, timing, application instructions and precau… as outlined in this Guide. Where two or more brand names are indicated, the weed may n… …ppear on all labels. See Field Crops Chart for complete weed spectrum.

| HERBICIDE | Crop Tolerance | Barnyard Grass | Foxtail: Green and Yellow | Wild Oats | Buckwheat, Wild | Catchfly, Night Flowering | Chickweed | Cleavers | Cow Cockle | Cocklebur | Flixweed | Hemp Nettle | Kochia | Lamb's Quarters | Mustard, Wild | Pigweed, Red Root | Quackgrass | Russian Thistle | Shepherd's Purse | Smartweed, Annual Species | Stinkweed | Thistle, Sow (Perennial) | Thistle, Canada | Volunteer Barley | Volunteer Wheat |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Carbyne 2 EC | G | | | P | | | | | | | | | | | | | | | | | | | | | |
| Excel | E | G | G | G | | | | | | | | | | | | | | | | | | | | G | |
| Hoe Grass 284 | G | G | G | G | | | | | | | | | | | | | | | | | | | | | |
| Poast | E | E | E | E | | | | | | | | | | | | | F[2] | | | | | | | G | G |
| Poast + Power Pack | E | E | E | E | | | | | | | | | | | | | F[2] | | | | | | | G | G |
| Rival/Treflan | F | G | G[4] | F | F | | G | | G | | | | | G | | G | | G[3] | | | | | | | |
| Sencor | F | | | | | | G | | | | | F | | G | G | | | | | G | G[1] | | | | |

**LEGEND**

| | Crop Tolerance | Weed Control |
|---|---|---|
| E — Excellent | Consistently exhibits a high degree of tolerance over a wide range of growing conditions | Consistently provides a high degree of control over a wide range of growing conditions |
| G — Good | Exhibits acceptable crop tolerance under most growing conditions | Provides acceptable control under most growing conditions |
| F — Fair | Tolerance is variable depending on growing conditions | Control is variable depending on growing conditions |
| P — Poor | Tolerance is often unacceptable | May provide some suppression but control is often unacceptable |

[1] Spring seedlings only. Overwintered rosettes will not be controlled.

[2] Top growth only, regrowth can be expected.

[3] Rival only

[4] Will not control trifluralin resistant foxtail.

### Preplant Incorporated

Manitoba Agriculture does not recommend fall application of soil incorporated herbicides to soils which are subject to wind or water erosion. Fall application to summerfallow fields or to soils with light trash cover or to light textured soils may predispose the field to erosion by wind and water and is not recommended.

### RIVAL 10 G (10%), TREFLAN QR 5 (5%)

**Caution: Triflurlin-resistant green foxtail has developed in Manitoba. Rival or Treflan will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:**
- a) Crop Stage: preplant incorporated in fall only.
- b) Weed Stage: preemergence.

**RATES:** According to Table below:

*Fall Applications (September 1 to freeze-up)*

| PRODUCT | SOIL TYPE | |
|---|---|---|
| | Light soils with less than 6% organic matter | Medium to heavy soils with 6-15% organic matter |
| Rival 10 G | 4.45 kg/acre* | 5.7 - 6.9 kg/acre |
| Treflan QR 5 | 8.9 kg/acre* | 11.3 - 13.8 kg/acre |

*Application to light textured soils in the fall may predispose fields to wind and water erosion.

Where a rate range is specified use the heavier rate where heavy infestations of wild oats are expected.

Although registered for fall application, the application and incorporation requirements for liquid formulations predispose soils to erosion and their use is not recommended.

**APPLICATION:** Use a calibrated granular applicator for granular applications.

**INCORPORATION:** Two incorporations required at right angles for thorough mixing. The first incorporation must be completed within 24 hours of application. Delay the second incorporation for 3 days after the first. Both incorporations must be done in the fall. *See Herbicide Incorporation section* for additional detail.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: No effect once incorporated.
- Grazing: Do not graze or harvest for forage.
- Recropping: Rival and Treflan leave a residue in the soil which may affect subsequent crops. *See Table 24* for a list of susceptible crops.
- Storage: May be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Injury may occur if soil conditions are not conducive to rapid emergence. To minimize crop injury, cultivate shallowly in the spring and seed the crop into a moist, packed seed bed no more than 1.5 inches (4 cm) deep using a hoe drill or press drill. Do not seed when soil condition is cold (generally, seeding should commence no earlier than May 15).

**COMMENTS:** Do not apply in spring as severe crop injury may result. Poor results will occur if dry conditions prevail prior to weed emergence. Shallow tillage in the spring is required to destroy existing weed growth and to warm the soil to activate the herbicide. Note that the seed placement requirements for trifluralin are too shallow for subsequent use of Sencor in this crop.

## Postemergence

### *CARBYNE 2 EC (240 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: Before the 4 leaf stage or within 14 days of emergence.

b) Weed Stage: 1 to 2 leaf stage and no later than 14 days following emergence.

**RATES:** 0.61 to 0.71 L/acre
Use the higher rate when wild oat density is 4 plants per square foot (40 plants per square metre) or more, when wild oats are not actively growing, or when wild oats have been injured by frost or wind.

**WATER VOLUME:** 18 L/acre

**PRESSURE:** 300 kPa (45 psi)

**NOZZLES:** Teejet 650067, 730067, 800067
Delavan LF.67-65, LF.77-73, LF.67-80
Spray Jet 65.067, TK.75, D.75
Direct spray 45° forward.

**TANK MIXES:**

- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Carbyne and other herbicides.

**RESTRICTIONS:**

- Rainfall: Do not apply if crop is wet with dew or rain. Rainfall within 15 minutes of application will reduce control.
- Grazing: Do not graze or harvest for forage within 5 weeks of application.
- Recropping: No restrictions the year after application.
- Storage: May be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Performs best under cool, moist weather conditions. Under adverse growing conditions control will be severely reduced.

**COMMENTS:** Due to the very narrow application timing and the need for strong crop competition for satisfactory control, opportunities for successful use of Carbyne are limited. In lentils use of an alternative wild oat herbicide is recommended.

### *EXCEL (90 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: No leaf stage restrictions. Do not apply within 82 days of harvest.

b) Weed Stage: Wild oats, foxtail, barnyard grass, and volunteer barley 1 to 4 leaf stage (Do not apply if total leaf number, including tillers, exceeds six); volunteer corn 2 to 10 inches (5 to 25 cm) tall.

**RATE:** 1.01 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Stainless steel 80° or 110° flat fan nozzles directed 45° forward.

**TANK MIXES:**

- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Excel and other herbicides.

**RESTRICTIONS:**

- Preharvest: Do not apply within 82 days of harvest.
- Rainfall: Within 3 hours will reduce control.
- Grazing: Do not graze or harvest as forage.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Poor weed control will occur if prolonged cool (12° C or cooler) or very hot (28° C or warmer) temperatures prevail. Low relative humidity and dry soil conditions will also reduce control. Control of weeds which have tillered are particularly liable to escape under these conditions.

**COMMENTS:** Excel does not suppress quackgrass.

### *HOE-GRASS 284 (284 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: No leaf stage restriction. Do not apply within 60 days of harvest.

b) Weed Stage: Wild oats, foxtail, barnyard grass 1 to 4 leaf stage, prior to tillering; Persian darnel 1 to 3 leaf stage; volunteer corn 6 to 10 inches (15 to 25 cm) in height. Although registered for application up to the 5 leaf stage of weeds, results at this late leaf stage are not consistent and therefore this use is not recommended.

### Lentils

**RATE:** 1.01 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** 80° flat fan.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 5 days after application of Hoe-Grass 284 before applying Sencor; allow 4 days after Hoe-Grass application before applying any other herbicides.

**RESTRICTIONS:**
- Preharvest: Do not apply within 60 days of harvest.
- Rainfall: Within 1 hour of application will reduce control.
- Grazing: Do not graze or harvest as forage.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Poor weed control will occur if hot (27° C or higher) or dry conditions prevail during spraying, in the period prior to spraying, or immediately after spraying. Applications under hot (above 27° C) or droughty conditions will result in reduced weed control.

**COMMENTS:** Hoe-Grass provides optimum results under cool, moist conditions and should be applied when the majority of weeds are in the 2 to 3 leaf stage for best results.

## *POAST (184 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: No leaf stage restriction but do not apply within 65 days of harvest.

b) Weed Stage: When the majority of the annual weeds are in the 2 to 5 leaf stage.
Quackgrass – 1 to 3 leaf.

**RATES:**

| WEED | RATE (L/acre) WITH ASSIST | RATE (L/acre) WITH MERGE |
|---|---|---|
| green or yellow foxtail, barnyard grass, proso millet, witchgrass and volunteer corn | 0.324 - 0.405 | 0.324 - 0.405 |
| wild oats | 0.57 - 0.65 | 0.57 - 0.65 |
| volunteer wheat and oats | 0.65 | 0.57 - 0.65 |
| volunteer bariey | 0.65 - 0.77 | 0.57 - 0.65 |
| quackgrass suppression | 1.78 | 1.1 |

Where a rate range is specified for a weed, use the higher rate to control heavy infestations.

**ADDITIVES:** Add Assist Oil Concentrate or Merge to all Poast treatments at 1 L per 100 L spray solution for annual weeds or at 1 to 2 L per 100 L spray solution for quackgrass. The use of Merge will provide more consistant annual grass control than use of Assist.

**WATER VOLUME:** 25 to 80 L/acre
Use the higher water volumes if crop or weed growth is dense and when spraying quackgrass.

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Stainless steel 80° flat fan directed 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: See Poast Power Pack recommendation for information on mixes with ammonium sulphate.
- Insecticides: None

Allow 5 days between application of Poast and Sencor; 4 days between Poast and other herbicides.

**RESTRICTIONS:**
- Preharvest: Do not apply within 65 days of harvest.
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or harvest for forage prior to crop maturity.
- Recropping: A cultivation to a 4 inch (10 cm) depth is required 7 days prior to re-seeding Poast-treated fields to grass crops (such as corn, cereals or forage grasses) in the year of treatment. Allow a minimum of 14 days between application of Poast and seeding of grass crops.
- Storage: May be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Control will be reduced if weeds are not actively growing due to drought, flooding or prolonged cool (15° C or cooler) periods. Do not apply if grassy weeds have been stressed for more than 20 days due to lack of moisture.

**COMMENTS:** For quackgrass suppression, rhizomes must be thoroughly fragmented prior to seeding. Quackgrass must be actively growing at the time of application for satisfactory results.

## *POAST (184 g/L) + POWER PACK [AMMONIUM SULPHATE (490 g/L) AND ASSIST OIL CONCENTRATE]*

**APPLICATION TIMING:**

a) Crop Stage: No leaf stage restrictions. Do not apply within 65 days of harvest.

b) Weed Stage: 2 to 5 leaf stage of annual grass weeds; 1 to 3 leaf stage of quackgrass.

**RATE:** 0.57 L/acre Poast for annual grasses.
1.1 L/acre Poast for quackgrass.

**ADDITIVES:** Add 1.62 L/acre Ammonium Sulphate and Assist Oil Concentrate at 1 L per 100 L spray solution. For quackgrass suppression, the rate of Assist Oil Concentrate may be increased to 2 L per 100 L spray solution.

**MIXING:** To mix, partially fill the tank with water, slowly add the Ammonium Sulphate, then add the Poast and finally, the Assist Oil Concentrate. Maintain agitation during mixing.

**WATER VOLUME:** 25 to 80 L/acre. Use the higher water volumes for heavy weed infestations or when applying to quackgrass.

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Stainless steel 80° flat fan nozzles directed 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: Mix only with technical grade ammonium sulphate at rates specified above.
- Insecticides: None

When using Sencor apply it first and allow 5 days before application of Poast + Power Pack. Allow 4 days between application of Poast Power Pack and other herbicides.

**RESTRICTIONS:**
- Preharvest: Do not apply within 65 days of harvest.
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or harvest as forage in year of treatment.
- Recropping: A cultivation to a 4 inch (10 cm) depth is required 7 days prior to re-seeding Poast-treated fields to grass crops (such as corn, cereals, forage grasses) in the year of treatment. Allow a minimum of 14 days between application of Poast and seeding of grass crops.
- Storage: Poast may be frozen but do not store the Ammonium Sulphate at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Control will be reduced if weeds are not actively growing due to drought, flooding or prolonged cool periods (15° C or cooler). Do not apply to grasses stressed for more than 20 days due to lack of moisture.

**COMMENTS:** Since Ammonium Sulphate is corrosive do not allow spray mixture to stand and thoroughly clean sprayer after use. Optimum results are obtained under warm moist conditions. Do not tank mix Poast + Power Pack with broadleaf herbicides as severe injury will result. For quackgrass suppression ensure that rhizomes are thoroughly fragmented by spring tillage prior to seeding.

## *SENCOR 500 F (500 g/L), SENCOR 75 DF (75%)*

**APPLICATION TIMING:**
a) Crop Stage: 3 to 6 inches (7.5 to 15 cm) vine length.
b) Weed Stage: Up to 2 inches (5 cm) height or diameter. Cotyledon to 2-leaf stage if using split applications.

**RATES:** Use 0.111 kg/acre Sencor DF or 0.172 L/acre Sencor 500. To obtain control of weed populations with staggered emergence, split applications of Sencor are recommended. Spray the first application of Sencor 500 F at 0.08 to 0.11 L/acre or Sencor 75 DF at 0.06 to 0.08 kg/acre. A second application within these rate ranges should be made 7 to 10 days later when more weed growth has appeared.

**WATER VOLUME:** 70 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles with tips no finer than 8002 or TK 2 directed 45° forward. Use 50-mesh screens and filters.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 5 days between application of Sencor and other herbicides.

**RESTRICTIONS:**
- Preharvest: Do not apply within 70 days of harvest.
- Rainfall: Within 6 hours will cause reduced weed control.
- Grazing: Do not graze or harvest as forage within 70 days of treatment.
- Recropping: No restrictions the year after application.
- Storage: Both formulations may be stored in unheated storage. If Sencor 500 is frozen warm to room temperature and agitate prior to use.

**ENVIRONMENTAL PRECAUTIONS:** Crop height reductions or yellowing will occur if high temperatures occur within 48 hours of application. Cold, cloudy weather or frost within 3 days of application will also aggravate injury. Heavy rainfall (1.25 inches (3 cm) or more) will cause stand thinning, particularly on soils with less than 4 per cent organic matter.

**COMMENTS:** Crop must be planted at least 2 inches (5 cm) deep. Note that this seed placement is too deep for use of Rival/Treflan/Triflurex in lentils.

## TABLE 10 SUMMARY OF MUSTARD RECOMMENDATIONS

Note: The ratings in this chart give general comparisons based on rates, timing, and other application instructions and precautions as outlined in this Guide.
Where two or more brand names are indicated, the weed may not appear on all labels. See Field Crops Chart for complete weed spectrum.

| HERBICIDE | Crop Tolerance | Barnyard Grass | Foxtail, Green and Yellow | Wild Oats | Buckwheat, Wild | Catchfly, Night Flowering | Chickweed | Cleavers | Cow Cockle | Cocklebur | Flixweed | Hemp Nettle | Kochia | Lamb's Quarters | Mustard, Wild | Pigweed, Red Root | Quackgrass | Russian Thistle | Shepherd's Purse | Smartweed, Annual Species | Stinkweed | Thistle, Sow (Perennial) | Thistle, Canada | Volunteer Barley | Volunteer Wheat |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Avadex BW | E | | | G | | | | | | | | | | | | | | | | | | | | | |
| Carbyne | E | | | P | | | | | | | | | | | | | | | | | | | | | |
| Edge | G | E | E[3] | G | G | | G | P | E | | | F | G | E | | E | | F | | F | | | | F | G |
| Excel | E | G | G | G | | | | | | | | | | | | | | | | | | | | G | |
| Fortress | G | | G[3] | G | | | | | | | | | | | | | | | | | | | | | |
| Hoe-Grass 284 | G | G | G | G | | | | | | | | | | | | | | | | | | | | | |
| Rival/Treflan/Triflurex | E | G | G[3] | F | F | | G | | G | | | | | G | | G | | G[2] | | | | | | | |

**LEGEND**

| | Crop Tolerance | Weed Control |
|---|---|---|
| E — Excellent | Consistently exhibits a high degree of tolerance over a wide range of growing conditions. | Consistently provides a high degree of control over a wide range of growing conditions. |
| G — Good | Exhibits acceptable crop tolerance under most growing conditions. | Provides acceptable control under most growing conditions. |
| F — Fair | Tolerance is variable depending on growing conditions. | Control is variable depending on growing conditions. |
| P — Poor | Tolerance is often unacceptable. | May provide some suppression but control is often unacceptable. |

[2] Rival or Triflurex only.
[3] Will not control trifluralin resistant foxtail.

## Preplant Incorporated

Manitoba Agriculture does not recommend fall application of soil incorporated herbicides to soils which are subject to wind or water erosion. Fall application to summerfallow fields, to soils with light trash cover or to light textured soils may predispose the field to erosion by wind and water and is not recommended.

## *AVADEX BW (400 g/L), AVADEX BW GRANULAR (10%)*

**APPLICATION TIMING:**
a) Crop Stage: preplant incorporated.
b) Weed Stage: preemergence.

**RATES:**

| APPLICATION | SOIL ORGANIC MATTER | | |
|---|---|---|---|
| | Less than 2% | 2 - 4% | More than 4% |
| Fall Granular | 5.7 kg/acre | 6.9 kg/acre | 8.9 kg/acre |
| Spring Granular | 6.9 kg/acre | 6.9 kg/acre | 8.9 kg/acre |
| Fall Liquid* | not recommended | not recommended | not recommended |
| Spring Liquid | 1.72 L/acre | 1.72 L/acre | 2.23 L/acre |

* Although registered for fall application, the application and incorporation requirements for the liquid formulation predisposes soils to erosion and its use in the fall is not recommended.

**APPLICATION:** Liquid — field sprayer.
Granular — granular applicator.

**WATER VOLUME:** 45 L/acre (liquid product only)

**PRESSURE:** 200 kPa (30 psi)

**NOZZLES:** Flat fan.

**INCORPORATION:** Two incorporations at right angles required for thorough mixing. The first incorporation should be completed as soon as possible on the day of spraying (liquid product) or within 48 hours of application (granular product). The second incorporation for the liquid may be done immediately after the first. For best results with the granular product delay the second incorporation at least 3 to 5 days. *Refer to Herbicide Incorporation section* for detailed incorporation instructions.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: Avadex BW liquid may be applied using liquid fertilizer as a carrier (conduct a compatibility test before mixing), or sprayed on dry urea fertilizer (*refer to Herbicide Incorporation section* for mixing and spreading instructions).
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Moisture is required for activation. Rainfall of at least 0.6 inches (1.5 cm) within 2 weeks of application is required for optimum results.
- Grazing: Do not graze or harvest as forage during the year of application.

- Recropping: Will damage domestic oats seeded within 21 months of application.
- Storage: Do not freeze the liquid. The granular may be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Very dry soil conditions in spring or prolonged cool soil temperatures at time of wild oat germination will result in reduced control.

**COMMENTS:** Poor results may be expected from incomplete incorporation due to wet, cloddy soil or heavy trash. Ridges left by seeding may disrupt the treated layer and allow escapes. Spring application of the liquid formulation generally provides a higher level of control than does the granular formulation applied in the spring.

## EDGE DF (50%), EDGE GRANULAR (5%)

Caution: **Trifluralin-resistant green foxtail has developed in Manitoba. Edge will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:**
a) Crop Stage: preplant incorporated
b) Weed Stage: pre-emergence.

**RATES:**

| Product | SOIL TYPE | | | |
|---|---|---|---|---|
| | Light Textured Soils | MEDIUM TO HEAVY TEXTURED SOILS | | |
| | 2 - 6% Organic Matter | 2 - 4% Organic Matter | 4 - 6% Organic Matter | 6 - 15% Organic Matter |
| Spring Edge DF | 0.69 kg/acre | 0.69 kg/acre | 0.89 kg/acre | 1.13 kg/acre |
| Fall Edge Granular | Not Recommended* | 8.9 kg/acre | 11.3 kg/acre | 11.3 kg/acre |
| Spring Edge Granular | 6.9 kg/acre | 6.9 kg/acre | 11.3 kg/acre | 11.3 kg/acre |

* The two fall incorporations required will leave light soils vulnerable to wind or water erosion. This use is not recommended.

Although Edge DF is registered for use in the fall, this use is not recommended as incorporation requirements may predispose fields to erosion.

**APPLICATION:** Edge Granular - granular applicator
Edge DF - sprayer equipped with jet or perforated pipe agitation (Return line agitation is not sufficient).

**WATER VOLUME:** 45 L/acre (Edge DF only)

**PRESSURE:** 275 kPa (40 psi) (Edge DF only)

**NOZZLES:** Flat fan equipped with 50-mesh or coarser nozzle screens (Edge DF only).

**MIXING:** When using Edge DF, fill the tank half full with water and begin agitation. Slowly add the required amount of Edge DF. Continue vigourous agitation at all times. Do not add Edge DF over the sump opening as filter plugging may occur.

**INCORPORATION:** Two incorporations required at right angles for thorough mixing. The first incorporation must be done within 24 hours of spraying. When using Edge DF, the second incorporation may be done immediately after the first. When using the granular formulation, delay the second incorporation for 3 days after the first. If applying Edge Granular in the fall, both incorporations must be done in the fall to obtain satisfactory results. See *Herbicide Information* section for additional details on incorporation.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: Edge DF may be tank mixed with liquid fertilizer. Conduct a compatibility test before mixing. Edge DF may also be impregnated onto dry bulk fertilizers. See *Herbicide Information* section for details on mixing and spreading.
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: No effect once incorporated.
- Grazing: Do not graze or harvest as forage prior to crop maturity.
- Recropping: Soil residues may affect subsequent crops. See *Table 24* for a list of susceptible crops.
- Storage: Store in a dry, cool place. May be frozen. Do not expose to prolonged heat or prolonged direct sunlight.

**ENVIRONMENTAL PRECAUTIONS:** Poor results can be expected if dry soil conditions prevail between application time and weed emergence.

**COMMENTS:** When using the fall-applied granular formulation, shallow spring tillage (separate from seedbed preparation and prior to seeding) is required to destroy existing weed growth and to warm the soil to activate the herbicide.

## FORTRESS (14%)

Caution: **Trifluralin-resistant green foxtail has developed in Manitoba. Fortress will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:**
a) Crop Stage: preplant incorporated in fall between September 15 and freeze-up or in the spring, prior to sowing the crop.

b) Weed Stage: pre-emergence.

**RATES:**

| Organic Matter | Rate (kg/acre) | |
|---|---|---|
| | Spring | Fall |
| Less than 4% | 5.67 | 5.67 |
| 4 - 6% | 6.88 | 5.67 |
| Greater than 6% | 6.88 | 6.88 |

**APPLICATION:** Apply with a calibrated granular applicator.

**INCORPORATION:** Incorporate twice at right angles, no deeper than 2 inches (5 cm). First incorporation must be done within 24 hours of application. If applying in the fall, the second incorporation may be delayed until spring, or may be performed 3 to 5 days after the first incorporation. If using spring applications, delay the second incorporation 3 to 5 days after the first incorporation. Refer to *Herbicide Information* section for detailed incorporation instructions.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Moisture is required for activation. Rainfall of at least 0.6 inches (1.5 cm) within 2 weeks of seeding crop is required to ensure optimum results.
- Grazing: Do not graze or harvest for forage.
- Recropping: Fortress will leave a residue in the soil. Oats, sugar beets, and small seeded forage grasses may be injured if planted within 24 months of application.
- Storage: Store in a cool, dry place. May be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Very dry conditions in the spring or prolonged cold soil temperatures at the time of weed germination will result in reduced control.

**COMMENTS:** Poor results can be expected from incomplete incorporation due to wet, cloddy soil or surface trash. Ridges left at seeding may disrupt the treated layer and allow weed escapes.

## *RIVAL (500 g/L), RIVAL 10 G (10%), TREFLAN EC (545 g/L), TREFLAN QR 5 (5%), TRIFLUREX (400 g/L)*

Caution: **Trifluralin-resistant green foxtail has developed in Manitoba. Rival, Treflan or Triflurex will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:**

a) Crop Stage: preplant incorporated.
b) Weed Stage: preemergence.

**RATES:**

*Spring Applications*

| PRODUCT | SOIL TYPE | |
|---|---|---|
| | **Light soils with less than 6% organic matter** | **Medium to heavy soils with 6–15% organic matter** |
| Rival | 0.65 L/acre | 0.9 - 1.1 L/acre |
| Rival 10 G | 3.4 kg/acre | 4.45 - 5.7 kg/acre |
| Treflan EC | 0.61 L/acre | 0.81 - 1.05 L/acre |
| Treflan QR 5 | 6.9 kg/acre | 8.9 - 11.3 kg/acre |
| Triflurex | 0.81 L/acre | 1.1 L/acre |

*Fall Applications (September 1 to freeze-up):*

| PRODUCT | SOIL TYPE | |
|---|---|---|
| | **Light soils with less than 6% organic matter** | **Medium to heavy soils with 6–15% organic matter** |
| Rival 10 G | 4.45 kg/acre* | 5.7 - 6.9 kg/acre |
| Treflan QR 5 | 8.9 kg/acre* | 11.3 - 13.8 kg/acre |

*Application to light textured soils in the fall may predispose fields to wind and water erosion.

Where a rate range is specified use the higher rate if dense wild oat infestations are expected.
The granular formulation is better suited to fall application, the liquid to spring application. Although liquid formulations are registered for fall application this use is not recommended as incorporation requirements may predispose fields to erosion.

**APPLICATION:** Liquid – field sprayer
Granular – granular applicator

**WATER VOLUME:** 45 L/acre (liquid product only)

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**INCORPORATION:** Two incorporations required at right angles for thorough mixing. The first incorporation must be completed within 24 hours of spraying. The second incorporation for the liquid may be done immediately after the first. When using the granular, delay the second incorporation for 3 days after the first. With fall applications the second incorporation may be delayed until the spring. *See the Herbicide Incorporation section* for additional details.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: May be applied with liquid fertilizer (eg. 28-0-0) as a carrier. Conduct a compatibility test before mixing. Rival EC or Treflan EC may be impregnated onto dry bulk fertilizer. See *Herbicide Information* section for details.
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: No effect once incorporated.
- Grazing: Do not graze or harvest for livestock feed in the year of treatment.

**Mustard**

- Recropping: Rival, Treflan and Triflurex leave a residue in the soil which may affect subsequent crops. *See Table 24* for a list of susceptible crops.
- Storage: Do not freeze the liquid formulations. If stored below 5° C bring contents to 15° C for 24 hours and shake well before using. Granular products may be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Poor weed control will result if dry conditions prevail at the time of weed emergence.

**COMMENTS:** Shallow tillage in the spring prior to seeding is required to destroy existing weed growth and to warm the soil to activate the herbicide.

## Postemergence

### *CARBYNE 2 EC (240 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: No restrictions on crop stage.
b) Weed Stage: 2 leaf stage and no later than 14 days following emergence.

**RATE:** 0.61 to 0.71 L/acre
Use the higher rate when wild oat density is 4 plants per square foot (40 plants per square metre) or more, when wild oats are not actively growing, or when wild oats have been injured by frost or wind.

**WATER VOLUME:** 18 L/acre

**PRESSURE:** 310 kPa (45 psi)

**NOZZLES:** Teejet 650067, 730067, 800067
Delavan LF.67-65, LF.77-73, LF.67-80
Spray Jet 65.067, TK.75, D.75
Direct spray 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Carbyne and other herbicides.

**RESTRICTIONS:**
- Rainfall: Do not apply when crop is wet with dew or rain. Rainfall within 15 minutes of application will reduce control.
- Grazing: Do not graze or harvest for forage within 5 weeks of application.
- Recropping: No restrictions the year after application.
- Storage: May be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Performs best under cool, moist weather conditions. Under adverse growing conditions control will be severely reduced.

**COMMENTS:** Due to the very narrow application timing and the need for strong crop competition for satisfactory control, opportunities for successful use of Carbyne are limited. For heavy infestations or variable leaf stages of wild oats use of an alternative herbicide is recommended.

### *EXCEL ([illegible] g/L)*

**APPLICATION TIMING:**
a) Crop Stage: No leaf stage restriction but do not apply within 75 days of harvest.
b) Weed Stage: Wild oats, foxtail, barnyard grass and volunteer barley 1 to 4 leaf stage (Do not apply if total leaf number, including tillers, exceeds six); volunteer corn 2 to 10 inches (5 to 25 cm) tall.

**RATE:** 0.91 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Stainless steel 80° or 110° flat fan nozzles directed 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Excel and other herbicides.

**RESTRICTIONS:**
- Preharvest: Do not apply within 60 days of harvest.
- Rainfall: Within 3 hours of application will reduce control.
- Grazing: Do not graze or harvest as forage prior to maturity.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Poor weed control will occur if prolonged cool (12° C or cooler) or very hot (28° C or warmer) temperatures prevail. Low relative humidity and dry soil conditions will also reduce control. Control of weeds which have tillered are particularly liable to escape under these conditions.

**COMMENTS:** Excel does not suppress quackgrass.

### *HOE-GRASS 284 (284 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: No leaf stage restriction but do not apply within 60 days of harvest.
b) Weed Stage: Wild oats, foxtail and barnyard grass 1 to 4 leaf stage and prior to tillering; Persian darnel 1 to 3 leaf stage; volunteer corn 6 to 10 inches (15 to 25 cm) in height. Although registered for application up to the 5 leaf stage of wild oats, results at this late leaf stage are inconsistent and this use is not recommended.

## Mustard

**RATE:** 1.01 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** 80° flat fan.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: Decis

Allow 4 days between application of Hoe-Grass 284 and other herbicides or fertilizers.

**RESTRICTIONS:**
- Preharvest: Do not apply within 60 days of harvest.
- Rainfall: Within 1 hour of application will reduce control.
- Grazing: Do not graze or harvest as forage prior to crop maturity.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Application under hot (above 27° C) or droughty conditions will result in reduced weed control.

**COMMENTS:** Hoe-Grass provides optimum results under cool, moist conditions and should be applied when the majority of the grassy weeds are in the 2 to 3 leaf stage for best results.

# Peas
## *(Field and Processing)*

### TABLE 11 SUMMARY OF PEA RECOMMENDATIONS

Note: The ratings in this chart give general comparisons based on rates, timing, and other application instructions and precautions as outlined in this Guide. Where two or more brand names are indicated, the weed may not appear on all labels. See Field Crops Chart for complete weed spectrum.

| HERBICIDE | Crop Tolerance | Barnyard Grass | Foxtail, Green and Yellow | Wild Oats | Buckwheat, Wild | Catchfly, Night Flowering | Chickweed | Cleavers | Cow Cockle | Cocklebur | Flixweed | Hemp Nettle | Kochia | Lamb's Quarters | Mustard, Wild | Pigweed, Red Root | Quackgrass | Russian Thistle | Shepherd's Purse | Smartweed, Annual Species | Stinkweed | Thistle, Sow (Perennial) | Thistle, Canada | Volunteer Barley | Volunteer Wheat |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Avadex BW | E | | | G | | | | | | | | | | | | | | | | | | | | | |
| Basagran | F | | | | | | F | | | F | | | | F | F | | | F | F[1] | F | F[1] | | P[2] | | |
| Carbyne 2 EC | G | | | P | | | | | | | | | | | | | | | | | | | | | |
| Edge | G | E | E[4] | G | G | | G | | E | | | F | G | E | | G | | F | | F | | | | F | G |
| Excel | E | G | G | G | | | | | | | | | | | | | | | | | | | | G | |
| Hoe-Grass 284 | G | G | G | G | | | | | | | | | | | | | | | | | | | | | |
| Lexone/Sencor | F | | | | | F | F | | | | | F | | F | F | F | | F | | F | F | | | | |
| MCPA Sodium Salt | F | | | | | | | | | | P[1] | | | P | G | | | | P[1] | | P[1] | | | | |
| Poast | E | E | E | E | | | | | | | | | | | | | F[2] | | | | | | | G | G |
| Rival/Treflan/Triflurex | G | G | G[4] | F | F | | G | | G | | | | | G | | G | | G[3] | | | | | | | |
| TCA (Bar-Fox/NaTA TCA) | G | | F | | | | | | | | | | | | | | | | | | | | | | |
| TCA + MCPA Sodium Salt | F | | F | | | | | | | | P[1] | | | P | G | | | | P[1] | | P[1] | | | | |
| Tropotox Plus | F | | | | | | | | | | | | | G | G | G | | | G[1] | | G[1] | P[2] | P[2] | | |

LEGEND

| | Crop Tolerance | Weed Control |
|---|---|---|
| E — Excellent | Consistently exhibits a high degree of tolerance over a wide range of growing conditions. | Consistently provides a high degree of control over a wide range of growing conditions. |
| G — Good | Exhibits acceptable crop tolerance under most growing conditions. | Provides acceptable control under most growing conditions. |
| F — Fair | Tolerance is variable depending on growing conditions. | Control is variable depending on growing conditions. |
| P — Poor | Tolerance is often unacceptable. | May provide some suppression but control is often unacceptable. |

[1] Spring seedlings only. Overwintered rosettes will not be controlled.

[2] Top growth only, regrowth can be expected.

[3] Rival or Triflurex only.

[4] Will not control trifluralin resistant foxtail.

## Preplant Incorporated

Manitoba Agriculture does not recommend fall application of soil incorporated herbicides to soils which are subject to wind or water erosion. Fall application to summerfallow fields, to soils with light trash cover or to light textured soils may predispose the field to erosion by wind and water and is not recommended.

### AVADEX BW (400 g/L)

**APPLICATION TIMING:**
a) Crop Stage: preplant incorporated in spring only.
b) Weed Stage: preemergence.

**RATES:** 1.72 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 200 kPa (30 psi)

**NOZZLES:** Flat fan.

**INCORPORATION:** Two incorporations at right angles required for thorough mixing. The first incorporation should be completed as soon as possible on the day of spraying. The second incorporation for the liquid may be done any time prior to seeding. *Refer to Herbicide Incorporation* section for detailed incorporation instructions.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: Avadex BW liquid may be applied using liquid fertilizer as a carrier (conduct a compatibility test before mixing), or sprayed on dry urea fertilizer (*refer to Herbicide Incorporation* section for mixing and spreading instructions).
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Moisture is required for activation. Rainfall of at least 0.6 inches (1.5 cm) within 2 weeks of application is required for optimum results.
- Grazing: Do not graze or harvest as forage during the year of application.
- Recropping: Will damage domestic oats seeded within 21 months of application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Very dry soil conditions in spring or prolonged cool soil temperatures at time of wild oat germination will result in reduced control.

**COMMENTS:** Poor results may be expected from incomplete incorporation due to wet, cloddy soil or heavy trash. Ridges left by seeding may disrupt the treated layer and allow escapes.

## *EDGE DF (50%), EDGE GRANULAR (5%)*

**Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Fortress will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:**
a) Crop Stage: preplant incorporated
b) Weed Stage: preemergence.

**RATES:**

| Product | SOIL TYPE | | | |
|---|---|---|---|---|
| | Light Textured Soils | MEDIUM TO HEAVY TEXTURED SOILS | | |
| | 2 - 6% Organic Matter | 2 - 4% Organic Matter | 4 - 6% Organic Matter | 6 - 15% Organic Matter |
| Spring Edge DF | 0.69 kg/acre | 0.69 kg/acre | 0.89 kg/acre | 1.13 kg/acre |
| Fall Edge Granular | Not Recommended* | 8.9 kg/acre | 11.3 kg/acre | 11.3 kg/acre |
| Spring Edge Granular | 6.9 kg/acre | 6.9 kg/acre | 11.3 kg/acre | 11.3 kg/acre |

* The two fall incorporations required will leave light soils vulnerable to wind or water erosion. This use is not recommended.

Although Edge DF is registered for use in the fall, this use is not recommended as incorporation requirements may predispose fields to erosion.

**APPLICATION:** Edge granular- granular applicator
Edge DF - sprayer equipped with jet or perforated pipe agitation (Return line agitation is not sufficient).

**WATER VOLUME:** 45 L/acre (Edge DF only)

**PRESSURE:** 275 kPa (40 psi) (Edge DF only)

**NOZZLES:** Flat fan equipped with 50-mesh or coarser nozzle screens (Edge DF only).

**MIXING:** When using Edge DF, fill the tank half full with water and begin agitation. Slowly add the required amount of Edge DF. Continue vigourous agitation at all times. Do not add Edge DF over the sump opening as filter plugging may occur.

**INCORPORATION:** Two incorporations required at right angles for thorough mixing. The first incorporation must be done within 24 hours of spraying. When using Edge DF, the second incorporation may be done immediately after the first. When using the granular formulation, delay the second incorporation for 3 days after the first. If applying Edge Granular in the fall, both incorporations must be done in the fall to obtain satisfactory results. See *Herbicide Information* section for additional details on incorporation.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: Edge DF may be tank mixed with liquid fertilizer. Conduct a compatibility test before mixing. Edge DF may also be impregnated onto dry bulk fertilizers. See *Herbicide Information* section for details on mixing and spreading.
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: No effect once incorporated.
- Grazing: Do not graze or harvest as forage prior to crop maturity.
- Recropping: Soil residues may affect subsequent crops. See *Table 24* for a list of susceptible crops.
- Storage: Store in a cool, dry place. May be frozen. Do not expose to prolonged heat or prolonged direct sunlight.

**ENVIRONMENTAL PRECAUTIONS:** Poor results can be expected if dry soil conditions prevail between application time and weed emergence.

**COMMENTS:** When using the fall-applied granular formulation, shallow spring tillage (separate from seedbed preparation and prior to seeding) is required to destroy existing weed growth and to warm the soil to activate the herbicide.

## *RIVAL (500 g/L), RIVAL 10 G (10%), TREFLAN EC (545 g/L), TREFLAN QR 5 (5%), TRIFLUREX (400 g/L)*

**Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Rival, Treflan or Triflurex will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:**
a) Crop Stage: preplant incorporated.
b) Weed Stage: preemergence.

**RATES:**

*Spring Applications*

| PRODUCT | SOIL TYPE | |
|---|---|---|
| | Light soils with less than 6% organic matter | Medium to heavy soils with 6–15% organic matter |
| Rival | 0.65 L/acre | 0.9 - 1.1 L/acre |
| Rival 10 G | 3.4 kg/acre | 4.45 - 5.7 kg/acre |
| Treflan EC | 0.61 L/acre | 0.81 - 1.05 L/acre |
| Treflan QR 5 | 6.9 kg/acre | 8.9 - 11.3 kg/acre |
| Triflurex | 0.81 L/acre | 1.1 L/acre |

## Peas

*Fall Applications (September 1 to freeze-up)*

| PRODUCT | SOIL TYPE | |
|---|---|---|
| | Light soils with less than 6% organic matter | Medium to heavy soils with 6–15% organic matter |
| Rival 10 G | 4.45 kg/acre* | 5.7 - 6.9 kg/acre |
| Treflan QR 5 | 8.9 kg/acre* | 11.3 - 13.8 kg/acre |

*Application to light textured soils in the fall may predispose fields to wind and water erosion.

The granular formulation is better suited to fall application, the liquid to spring application. Although liquid formulations are registered for fall application this use is not recommended as incorporation requirements may predispose fields to erosion.

**APPLICATION:** Liquid — field sprayer
Granular — granular applicator

**WATER VOLUME:** 45 L/acre (liquid product only)

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**INCORPORATION:** Two incorporations required at right angles for thorough mixing. The first incorporation must be completed within 24 hours of spraying. The second incorporation for the liquid may be done immediately after the first. When using the granular, delay the second incorporation for 3 days after the first. With fall applications the second incorporation may be delayed until the spring. *See the Herbicide Incorporation section* for additional details.

**TANK MIXES:**
- Herbicides: Although Sencor is registered for tank mixing with Treflan EC as a fall-applied, preplant incorporated treatment, its use is not recommended as incorporation requirements may predispose fields to erosion.
- Fertilizer: May be applied with liquid fertilizer (eg. 28-0-0) as a carrier. Conduct a compatibility test before mixing. Rival EC or Treflan EC may be impregnated onto dry bulk fertilizer. See *Herbicide Information* section for details.
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: No effect once incorporated.
- Grazing: Do not graze or harvest for livestock feed in the year of treatment.
- Recropping: Rival, Treflan and Triflurex leave a residue in the soil which may affect subsequent crops. *See Table 24* for a list of susceptible crops.
- Storage: Do not freeze the liquid formulations. If stored below 5° C bring contents to 15° C for 24 hours and shake well before using. Granular may be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Poor results will occur if dry conditions prevail at the time of weed emergence.

## Postemergence

### *BAR-FOX AND TCA*

### *BASAGRAN (480 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: after the peas have 3 pairs of leaves.
b) Weed Stage: apply when weeds are at the height recommended in the rate table below.

**RATES:**

| Weeds | Rate of Basagran when weeds listed below are within the recommended treatment height | | | |
|---|---|---|---|---|
| | 0.71 L/acre inches | (cm) | 0.91 L/acre inches | (cm) |
| **Annual Weeds** | | | | |
| Black nightshade | | | 0.2 – 0.7 | (0.5 – 1.8) |
| Cocklebur | 3 – 7 | (7.5 – 17.5) | 7 – 12 | (17.5 – 30.5) |
| Common chickweed | apply 1 to 3 weeks after chickweed emergence | | | |
| Common groundsel | | | 2 – 4 | ( 5.0 – 10.0) |
| Common ragweed | | | 1 – 2 | ( 2.5 – 5.0) |
| Corn spurry | | | 1 – 4 | ( 2.5 – 10.0) |
| Hairy galinsoga | | | 2 – 3 | ( 5.0 – 7.5) |
| Lady's thumb | 1 – 3 | (2.5 – 7.5) | 3 – 8 | ( 7.5 – 20.0) |
| Lamb's quarters | | | 0.5 – 1.0 | ( 1.3 – 2.5) |
| Purslane | | | 1 – 2 | ( 2.5 – 5.0) |
| Red root pigweed | | | 0.5 – 1.25 | ( 1.3 – 3.2) |
| Russian thistle | | | 1 – 3 | ( 2.5 – 7.5) |
| Venice mallow | 1 – 2 | (2.5 – 5.0) | 2 – 4 | ( 5.0 – 10.0) |
| Wild mustard | 1 – 5 | (2.5 – 12.5) | 5 – 10 | (12.5 – 25.0) |
| **Perennial Weeds** | – repeat application 7 to 10 days after first application | | | |
| Canada thistle | 6 – 8 | (15 – 20 ) | more than 8 | (more than 20) |
| Yellow nutsedge | 6 – 8 | (15 – 20 ) | more than 8 | (more than 20) |

**ADDITIVES:** Add Citowett Plus at 0.25 L per 100 L spray mixture.

**WATER VOLUME:** 80 to 160 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Standard flat fan nozzles capable of delivering high water volumes.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Basagran and other herbicides, fertilizers or insecticides.

**RESTRICTIONS:**
- Rainfall: Within 8 hours will reduce control.
- Grazing: Do not graze or harvest as forage.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Poor results will occur if temperatures are cool. Apply only if daytime temperatures will exceed 21° C.

**COMMENTS:** Use at least 80 L/acre water to ensure thorough coverage with this contact herbicide. Top growth of thistles will be burnt off but rapid regrowth should be expected.

## CARBYNE 2 EC (240 g/L)

**APPLICATION TIMING:**
a) Crop Stage: before the crop has developed 3 nodes.
b) Weed Stage: 2 leaf stage and no later than 14 days following emergence.

**RATE:** 0.61 to 0.71 L/acre
Use the higher rate when wild oat density is 4 plants per square foot (40 plants per square metre) or more, when wild oats are not actively growing, or when wild oats have been injured by frost or wind.

**WATER VOLUME:** 18 L/acre

**PRESSURE:** 310 kPa (45 psi)

**NOZZLES:** Teejet 650067, 730067, 800067
Delavan LF.67-65, LF.77-73, LF.67-80
Spray Jet 65.067, TK.75, D.75
Direct spray 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Carbyne and other herbicides.

**RESTRICTIONS:**
- Rainfall: Do not apply when crop is wet with dew or rain. Rainfall within 15 minutes will reduce control.
- Grazing: Do not graze or harvest for forage within 5 weeks of application, do not feed the lower 3.5 inches (8 cm) of pea vines.
- Recropping: No restrictions the year after application.
- Storage: May be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Performs best under cool, moist weather conditions. Under adverse growing conditions control will be severely reduced.

**COMMENTS:** Due to the very narrow application timing and the need for strong crop competition for satisfactory control opportunities for successful use of Carbyne are limited. For heavy infestations or variable leaf stages of wild oats use of an alternative herbicide is recommended.

## EXCEL (90 g/L)

**APPLICATION TIMING:**
a) Crop Stage: No leaf stage restriction but do not apply within 60 days of harvest.
b) Weed Stage: Wild oats, foxtail, barnyard grass, and volunteer barley 1 to 4 leaf stage (Do not apply if total leaf number, including tillers, exceeds six); volunteer corn 2 to 10 inches (5 to 25 cm) tall.

**RATE:** 0.91 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Stainless steel 80° or 110° flat fan nozzles directed 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Excel and other herbicides.

**RESTRICTIONS:**
- Preharvest: Do not apply within 75 days of harvest.
- Rainfall: Within 1 hour of application will reduce control.
- Grazing: Do not graze or harvest as forage prior to maturity.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Poor weed control will occur if prolonged cool (12° C or cooler) or very hot (28° C or warmer) temperatures prevail. Low relative humidity and dry soil conditions will also reduce control. Weeds which have tillered are particularly liable to escape under these conditions.

**COMMENTS:** Excel does not suppress quackgrass.

## HOE-GRASS (284 g/L)

**APPLICATION TIMING:**
a) Crop Stage: No leaf stage restriction but do not apply within 60 days of harvest.
b) Weed Stage: Wild oats, foxtail and barnyard grass 1 to 4 leaf stage and prior to tillering; Persian darnel 1 to 3 leaf stage; volunteer corn 6 to 10 inches (15 to 25 cm) in height. Although registered for application up to the 5 leaf stage of wild oats, results at this late leaf stage are inconsistent and this use is not recommended.

**RATE:** 1.01 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** 80° flat fan directed 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Hoe-Grass 284 and other herbicides or fertilizers.

**RESTRICTIONS:**
- Preharvest: Do not apply within 60 days of harvest.
- Rainfall: Within 1 hour of application will reduce control.
- Grazing: Do not graze or harvest as forage prior to crop maturity.

**Peas**

- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Application under hot (above 27° C) or droughty conditions will result in reduced weed control.

**COMMENTS:** Hoe-Grass provides optimum results under cool, moist conditions and should be applied when the majority of the grassy weeds are in the 2 to 3 leaf stage for best results.

### LEXONE DF (75%), SENCOR 500 F (500 g/L), SENCOR 75 DF (75%)

**APPLICATION TIMING:**
a) Crop Stage: up to 6 inches (15 cm) vine length.
b) Weed Stage: up to 2 inches (5 cm) in height or diameter.

**RATES:** Sencor DF – 0.111 to 0.152 kg/acre
Sencor 500 F – 0.172 to 0.223 L/acre
Lexone DF – 0.113 to 0.152 kg/acre

**WATER VOLUME:** 70 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles with tips no finer than 8002 or TK 2 directed 45° forward. Use 50-mesh screens and filters.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 5 days between application of Lexone or Sencor and other herbicides.

**RESTRICTIONS:**
- Preharvest: Do not apply within 70 days of harvest.
- Rainfall: Within 6 hours will reduce control.
- Grazing: Do not graze or harvest as forage within 70 days of treatment.
- Recropping: No restrictions the year after application.
- Storage: These formulations may be stored in unheated storage but heated storage is preferred for Sencor 500. If frozen, ensure Sencor 500 has been thoroughly resuspended prior to use.

**ENVIRONMENTAL PRECAUTIONS:** Crop height reductions and yellowing will occur if high temperatures are experienced within 48 hours of application. Cold, cloudy weather or frost within 3 days of application will also result in injury. Heavy rainfall (1.25 inches (3 cm) or more) will cause stand thinning, particularly on soils with less than 4% organic matter.

**COMMENTS:** Crop must be planted at least 2 inches (5 cm) deep. Do not use on soils with less than 3% organic matter. Under conditions of heavy weed pressure or lush growth this treatment may not provide adequate control due to regrowth of some weeds.

### MCPA SODIUM SALT (300 g/L)

**APPLICATION TIMING:**
a) Crop Stage: Vines 4 to 7 inches (10 to 18 cm) long.
b) Weed Stage: 2 to 4 leaf stage.

**RATE:** 0.405 L/acre

**WATER VOLUME:** 60 to 80 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**
- Herbicides: May be tank mixed with TCA.
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of MCPA and other herbicides.

**RESTRICTIONS:**
- Rainfall: Within 6 hours will reduce control.
- Grazing: Do not graze or harvest as forage for dairy cattle within 7 days of treatment.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Injury to peas may occur under hot, humid conditions or under prolonged, cool periods.

### *NaTA TCA see TCA*

### *POAST (184 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: No leaf stage restrictions but do not apply within 60 days of harvest.
b) Weed Stage: When the majority of the annual weeds are in the 2 to 5 leaf stage. Quackgrass 1 to 3 leaf.

**RATES:**

| WEED | RATE (L/acre) WITH ASSIST | RATE (L/acre) WITH MERGE |
|---|---|---|
| green or yellow foxtail, barnyard grass, proso millet, witchgrass and volunteer corn | 0.324 - 0.405 | 0.324 - 0.405 |
| wild oats | 0.57 - 0.65 | 0.57 - 0.65 |
| volunteer wheat and oats | 0.65 | 0.57 - 0.65 |
| volunteer barley | 0.65 - 0.77 | 0.57 - 0.65 |
| quackgrass suppression | 1.78 | 1.1 |

Where a rate range is specified for a weed, use the high rate for heavy infestations.

**ADDITIVES:** Add Assist Oil Concentrate or Merge to all Poast treatments. Use 1 L per 100 L spray solution for annual weeds, or 2 L per 100 L spray solution for quackgrass. The use of Merge will provide more consistent annual grass control than use of Assist.

**WATER VOLUME:** 25 to 80 L/acre. Apply at least 45 L/acre if crop or weed growth is dense and when spraying quackgrass.

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Stainless steel 80° flat fan directed 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None. See Poast Power Pack recommendations for information on mixtures with ammonium sulphate.
- Insecticides: None

Allow 4 days between application of Poast and other herbicides.

**RESTRICTIONS:**
- Preharvest: Do not apply within 60 days of harvest.
- Rainfall: Within 1 hour of application will reduce control.
- Grazing: Do not graze or harvest as forage prior to crop maturity.
- Recropping: A cultivation to a 4 inch (10 cm) depth is required 7 days prior to re-seeding Poast-treated fields to grass crops (such as corn, cereals or forage grasses) in the year of treatment. Allow a minimum of 14 days between application of Poast and seeding of grass crops.
- Storage: May be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Control will be reduced if weeds are not actively growing due to drought, flooding or prolonged cool (15° C or cooler) periods. Do not apply if grassy weeds are stressed for more than 20 days due to lack of moisture.

**COMMENTS:** For quackgrass suppression, rhizomes must be thoroughly fragmented by tillage prior to seeding. Poor results can be expected if quackgrass is not actively growing at the time of treatment.

## *POAST (184 g/L) + POWER PACK [AMMONIUM SULPHATE (490 g/L) AND ASSIST OIL CONCENTRATE]*

**APPLICATION TIMING:**

a) Crop Stage: No leaf stage restrictions but do not apply within 60 days of harvest.
b) Weed Stage: 2 to 5 leaf stage of annual weeds.

**RATE:** 0.57 L/acre

**ADDITIVES:** Add 1.62 L/acre ammonium sulphate and Assist Oil Concentrate at 1 L per 100 L spray solution.

**WATER VOLUME** Use 25 to 45 L/acre spray solution. If heavy infestations of volunteer cereals are present, use 60 L/acre spray solution.

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Stainless steel 80° flat fan directed 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: Mix only with the technical grade ammonium sulphate at rates specified above.
- Insecticides: None

Allow 5 days after application of Lexone or Sencor before applying Poast Power Pack. Allow 4 days between application of Poast Power Pack and other herbicides.

**RESTRICTIONS:**
- Preharvest: Do not apply within 60 days of harvest.
- Rainfall: Within 1 hour of application will reduce control.
- Grazing: Do not graze or harvest as forage prior to crop maturity.
- Recropping: A cultivation to a 4 inch (10 cm) depth is required 7 days prior to re-seeding Poast-treated fields to grass crops (such as corn, cereals or forage grasses) in the year of treatment. Allow a minimum of 14 days between application of Poast and seeding of grass crops.
- Storage: Poast may be frozen but do not store the ammonium sulphate at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Control will be reduced if weeds are not actively growing due to drought, flooding or prolonged cool periods (15° C or cooler). Do not apply to grasses stressed more than 20 days due to lack of moisture.

**COMMENTS:** Since ammonium sulphate is corrosive do not allow spray mixture to stand and thoroughly clean sprayer after use. Optimum results are obtained under warm, moist conditions. Poast Power Pack is not registered for quackgrass suppression in this crop. For quackgrass suppression see the Poast recommendation.

## *SENCOR see LEXONE*

## *TCA [Bar-fox (83%), NaTA TCA (83%)]*

**APPLICATION TIMING:**

a) Crop Stage: vines 4 to 8 inches (10 to 18 cm) long.
b) Weed Stage: 1 to 2 leaf stage.

**RATE:** 1.81 kg/acre

**WATER VOLUME:** 45 to 60 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles with 50-mesh screens.

**TANK MIXES:**
- Herbicides: Can be tank mixed with MCPA Sodium Salt.
- Fertilizer: None

- Insecticides: None

Allow 4 days between application of TCA and other herbicides.

**RESTRICTIONS:**

- Rainfall: A light rainfall after application is beneficial for activation.
- Grazing: Do not graze for at least 24 hours.
- Recropping: No restrictions the year after treatment.
- Storage: Bar-fox and NaTA TCA may be kept in unheated storage.

**ENVIRONMENTAL PRECAUTIONS:** Since TCA acts primarily through the soil there will be variations in control depending on soil moisture conditions. Control will be reduced under dry soil conditions.

**COMMENTS:** Control of foxtail with TCA is variable and depends on strong crop competition. For heavy infestations of green foxtail, use of an alternative green foxtail herbicide is recommended.

## TROPOTOX PLUS (400 g/L)

**APPLICATION TIMING:**

a) Crop Stage: when peas have 3 to 6 nodes.
b) Weed Stage: 2 to 4 leaf stage.

**RATE:** 1.11 to 1.72 L/acre. Use the higher rate for heavy weed infestations, under cool or dry growing conditions, and for Canada thistle suppression.

**WATER VOLUME:** 60 to 80 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**

- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Tropotox Plus and other herbicides.

**RESTRICTIONS:**

- Rainfall: Within 4 hours will reduce control.
- Grazing: Do not graze or harvest as forage in year of treatment.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Applications under drought conditions will result in increased crop injury. Best activity on weeds occurs in warm weather. Under extremely hot or humid conditions, crop injury may be severe.

**COMMENTS:** Crop damage may occur if peas are past the recommended stage. Early maturing varieties are more sensitive to this herbicide.

# Rapeseed (including Canola)

## TABLE 12 SUMMARY OF RAPESEED RECOMMENDATIONS

Note: The ratings in this chart give general comparisons based on rates, timing, and other application instructions and precautions as outlined in this Guide.
Where two or more brand names are indicated, the weed may not appear on all labels. See Field Crops Chart for complete weed spectrum.

| HERBICIDE | Crop Tolerance | Barnyard Grass | Foxtail, Green and Yellow | Wild Oats | Buckwheat, Wild | Catchfly, Night Flowering | Chickweed | Cleavers | Cow Cockle | Cocklebur | Flixweed | Hemp Nettle | Kochia | Lamb's Quarters | Mustard, Wild | Pigweed, Red Root | Quackgrass | Russian Thistle | Shepherd's Purse | Smartweed, Annual Species | Stinkweed | Thistle, Sow (Perennial) | Thistle, Canada | Volunteer Barley | Volunteer Wheat |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Avadex BW | E | | | G | | | | | | | | | | | | | | | | | | | | | |
| Carbyne 2 EC | G | | | P | | | | | | | | | | | | | | | | | | | | | |
| Edge | G | E | E[3] | G | G | | G | P | E | | | F | G | E | | E | | F | | F | | | | F | G |
| Excel | E | G | G | G | | | | | | | | | | | | | | | | | | | | G | |
| Excel + Lontrel | E | G | G | G | F | | | | | | | | | | | | | | | | | F[1] | F[1] | G | |
| Fortress | G | | G[3] | G | | | | | | | | | | | | | | | | | | | | | |
| Fusilade | E | E | | G | | | | | | | | | | | | | P[1] | | | | | | | E | E |
| Fusilade + Lontrel | G | E | | G | F | | | | | | | | | | | | P[1] | | | | | G[1] | E | E | E |
| Hoe-Grass 284 | G | G | G | G | | | | | | | | | | | | | | | | | | | | | |
| Hoe-Grass 284 + Lontrel | G | G | G | G | F | | | | | | | | | | | | | | | | | F[1] | F[1] | | |
| Lontrel | G | | | | F | | | | | | | | | | | | | | | | | G[1] | E | | |
| Poast | E | E | E | E | | | | | | | | | | | | | F[1] | | | | | | | G | G |
| Poast + Lontrel | G | E | E | G | F | | | | | | | | | | | | F[1] | | | | | G[1] | E | G | G |
| Rival/Treflan/Triflurex | E | G | G[3] | F | F | | G | | G | | | | | G | | G | | G[2] | | | | | | | |
| TCA (Bar-Fox/NaTA TCA) | G | | F | | | | | | | | | | | | | | | | | | | | | | |

**LEGEND**

| | Crop Tolerance | Weed Control |
|---|---|---|
| E — Excellent | Consistently exhibits a high degree of tolerance over a wide range of growing conditions | Consistently provides a high degree of control over a wide range of growing conditions |
| G — Good | Exhibits acceptable crop tolerance under most growing conditions | Provides acceptable control under most growing conditions |
| F — Fair | Tolerance is variable depending on growing conditions | Control is variable depending on growing conditions |
| P — Poor | Tolerance is often unacceptable | May provide some suppression but control is often unacceptable |

[1] Top growth only, regrowth can be expected

[2] Rival or Triflurex only

[3] Will not control trifluralin-resistant foxtail

## Preplant Incorporated

Manitoba Agriculture does not recommend fall application of soil incorporated herbicides to soils which are subject to wind or water erosion. Fall application to summerfallow fields, to soils with light trash cover or to light textured soils may predispose the field to erosion by wind and water and is not recommended.

### AVADEX BW (400 g/L), AVADEX BW GRANULAR (10%)

**APPLICATION TIMING:**
a) Crop Stage: preplant incorporated.
b) Weed Stage: preemergence.

**RATES:**

| PRODUCT | SOIL ORGANIC MATTER | | |
|---|---|---|---|
| | Less than 2% | 2 - 4% | More than 4% |
| Fall Granular | 5.7 kg/acre | 6.9 kg/acre | 8.9 kg/acre |
| Spring Granular | 6.9 kg/acre | 6.9 kg/acre | 8.9 kg/acre |
| Fall Liquid* | not recommended | not recommended | not recommended |
| Spring Liquid | 1.72 L/acre | 1.72 L/acre | 2.23 L/acre |

*Although registered for fall application, the application and incorporation requirements for the liquid formulation predisposes soils to erosion and their use in the fall is not recommended.

**APPLICATION:** Liquid — field sprayer
Granular — granular applicator

**WATER VOLUME:** 45 L/acre (liquid product only)

**PRESSURE:** 200 kPa (30 psi)

**NOZZLES:** Flat fan (liquid product only).

**INCORPORATION:** Two incorporations at right angles required for thorough mixing. The first incorporation should be completed as soon as possible on the day of spraying (liquid product) or within 48 hours of application (granular product). The second incorporation for the liquid may be done immediately after the first. For best results with the granular product delay the second incorporation at least 3 to 5 days. *Refer to Herbicide Incorporation section* for detailed incorporation instructions.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: Avadex BW liquid may be applied using liquid fertilizer as a carrier (conduct a compatibility test before mixing), or sprayed on dry urea fertilizer (*refer to Herbicide Incorporation section* for mixing and spreading instructions).
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Moisture is required for activation. Rainfall of at least 0.6 inches (1.5 cm) within 2 weeks of application is required for optimum results.
- Grazing: Do not graze or harvest as forage during the year of application.
- Recropping: Will damage domestic oats seeded within 21 months of application.
- Storage: Do not freeze the liquid. The granular may be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Very dry soil conditions in spring or prolonged cool soil temperatures at time of wild oat germination will result in reduced control.

**COMMENTS:** Poor results may be expected from incomplete incorporation due to wet, cloddy soil or heavy trash. Ridges left by seeding may disrupt the treated layer and allow weed escapes. Spring application of the liquid formulation generally provides a higher level of control than does the granular formulation applied in the spring.

## *EDGE DF (50%), EDGE GRANULAR (5%)*

**Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Edge will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:**
a) Crop Stage: preplant incorporated
b) Weed Stage: pre-emergence.

**RATES:**

| Product | SOIL TYPE | | | |
|---|---|---|---|---|
| | Light Textured Soils 2 - 6% Organic Matter | MEDIUM TO HEAVY TEXTURED SOILS | | |
| | | 2 - 4% Organic Matter | 4 - 6% Organic Matter | 6 - 15% Organic Matter |
| Spring Edge DF | 0.69 kg/acre | 0.69 kg/acre | 0.89 kg/acre | 1.13 kg/acre |
| Fall Edge Granular | Not Recommended* | 8.9 kg/acre | 11.3 kg/acre | 11.3 kg/acre |
| Spring Edge Granular | 6.9 kg/acre | 6.9 kg/acre | 11.3 kg/acre | 11.3 kg/acre |

* The two fall incorporations required will leave light soils vulnerable to wind or water erosion. This use is not recommended.

Although Edge DF is registered for use in the fall, this use is not recommended as incorporation requirements may predispose fields to erosion.

**APPLICATION:** Edge granular - granular applicator
Edge DF - sprayer equipped with jet or perforated pipe agitation (Return line agitation is not sufficient).

**WATER VOLUME:** 45 L/acre (Edge DF only)

**PRESSURE:** 275 kPa (40 psi) (Edge DF only)

**NOZZLES:** Flat fan equipped with 50-mesh or coarser nozzle screens (Edge DF only).

**MIXING:** When using Edge DF, fill the tank half full with water and begin agitation. Slowly add the required amount of Edge DF. Continue vigourous agitation at all times. Do not add Edge DF over the sump opening as filter plugging may occur.

**INCORPORATION:** Two incorporations required at right angles for thorough mixing. The first incorporation must be done within 24 hours of spraying. When using Edge DF, the second incorporation may be done immediately after the first. When using the granular formulation, delay the second incorporation for 3 days after the first. If applying Edge Granular in the fall, both incorporations must be done in the fall to obtain satisfactory results. See *Herbicide Information* section for additional details on incorporation.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: Edge DF may be tank mixed with liquid fertilizer. Conduct a compatibility test before mixing. Edge DF may also be impregnated onto dry bulk fertilizers. See *Herbicide Information* section for details on mixing and spreading.
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: No effect once incorporated.
- Grazing: Do not graze or harvest as forage prior to crop maturity.
- Recropping: Soil residues may affect subsequent crops. *See Table 24* for a list of susceptible crops.
- Storage: Store in a cool, dry place. May be frozen. Do not expose to prolonged heat or prolonged direct sunlight.

**ENVIRONMENTAL PRECAUTIONS:** Poor results can be expected if dry soil conditions prevail between application time and weed emergence.

**COMMENTS:** When using the fall-applied granular formulation, shallow spring tillage (separate from seedbed preparation and prior to seeding) is required to destroy existing weed growth and to warm the soil to activate the herbicide.

## *FORTRESS (14%)*

**Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Fortress will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:**
- a) Crop Stage: preplant incorporated in fall between September 15 and freeze-up, or in the spring, prior to sowing the crop.
- b) Weed Stage: pre-emergence

**RATES:**

| Organic Matter | Rate (kg/acre) | |
|---|---|---|
| | Spring | Fall |
| Less than 4% | 5.67 | 5.67 |
| 4 - 6% | 6.88 | 5.67 |
| Greater than 6% | 6.88 | 6.88 |

**APPLICATION:** Apply with a calibrated granular applicator.

**INCORPORATION:** Incorporate twice at right angles, no deeper than 2 inches (5 cm). First incorporation must be done within 24 hours of application. If applying in the fall, the second incorporation may be delayed until the following spring, or may be performed 3 to 5 days after the first incorporation. If using spring applications, delay the second incorporation 3 to 5 days after the first incorporation. Refer to the *Herbicide Information* section for detailed incorporation instructions.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Moisture is required for activation. Rainfall of at least 0.6 inches (1.5 cm) within 2 weeks of seeding crop is required to ensure optimum results.
- Grazing: Do not graze or harvest for forage.
- Recropping: Fortress will leave a residue in the soil. Oats, sugar beets, and small seeded forage grasses may be injured if planted within 24 months of application.
- Storage: Store in a cool, dry place. May be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Very dry conditions in the spring or prolonged cold soil temperatures at the time of weed germination will result in reduced control.

**COMMENTS:** Poor results can be expected from incomplete incorporation due to wet, cloddy soil or surface trash. Ridges left at seeding may disrupt the treated layer and allow escapes.

## *RIVAL (500 g/L), RIVAL 10 G (10%), TREFLAN EC (545 g/L), TREFLAN QR 5 (5%), TRIFLUREX (400 g/L)*

**Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Rival, Treflan or Triflurex will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:**
- a) Crop Stage: preplant incorporated.
- b) Weed Stage: preemergence.

**RATES:**

*Spring Applications*

| PRODUCT | SOIL TYPE | |
|---|---|---|
| | Light soils with less than 6% organic matter | Medium to heavy soils with 6–15% organic matter |
| Rival | 0.65 L/acre | 0.9 - 1.1 L/acre |
| Rival 10 G | 3.4 kg/acre | 4.45 - 5.7 kg/acre |
| Treflan EC | 0.61 L/acre | 0.81 - 1.05 L/acre |
| Treflan QR 5 | 6.9 kg/acre | 8.9 - 11.3 kg/acre |
| Triflurex | 0.81 L/acre | 1.1 L/acre |

*Fall Applications (September 1 to freeze-up)*

| PRODUCT | SOIL TYPE | |
|---|---|---|
| | Light soils with less than 6% organic matter | Medium to heavy soils with 6–15% organic matter |
| Rival 10 G | 4.45 kg/acre* | 5.7 - 6.9 kg/acre |
| Treflan QR 5 | 8.9 kg/acre* | 11.3 - 13.8 kg/acre |

*Application to light textured soils in the fall may predispose fields to wind and water erosion.

Where a rate range is specified use the higher rate if dense wild oat infestations are expected.

The granular formulation is better suited to fall application, the liquid to spring application. Although liquid formulations are registered for fall application this use is not recommended as incorporation requirements will predispose fields to erosion.

**APPLICATION:** Liquid — field sprayer
Granular — granular applicator

**WATER VOLUME:** 45 L/acre (liquid product only)

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan (liquid product only).

**INCORPORATION:** Two incorporations required at right angles for thorough mixing. The first incorporation must be completed within 24 hours of spraying. The second incorporation for the liquid may be done immediately after the first. When using the granular delay the second incorporation for 3 days after the first. With fall applications the second incorporation may be delayed until the spring. *See Herbicide Incorporation section* for additional details.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: May be applied with liquid fertilizer (eg. 28-0-0) as a carrier. Conduct a compatibility test before mixing. Rival EC or Treflan EC may be impregnated onto dry bulk fertilizer. See *Herbicide Information* section for details.
- Insecticides: None

### Rapeseed

**RESTRICTIONS:**
- Rainfall: No effect once incorporated.
- Grazing: Do not graze or harvest for livestock feed in the year of treatment.
- Recropping: Rival, Treflan and Triflurex leave a residue in the soil which may affect subsequent crops. *See Table 24* for a list of susceptible crops.
- Storage: Do not freeze the liquid formulations. If stored below 5° C bring contents to 15° C for 24 hours and shake well before using. Granular products may be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Reduced weed control can be expected if dry conditions prevail at time of weed emergence.

**COMMENTS:** Shallow tillage in the spring prior to seeding is required to destroy existing weed growth and to warm the soil to activate the herbicide.

### Postemergence

Rapeseed (Canola) is extremely sensitive to broadleaf herbicides. Ensure that sprayers are thoroughly cleaned before using to apply herbicides to rapeseed (Canola). Consult with herbicide manufacturer for detailed instructions on cleaning sprayers.

## BAR-FOX see TCA

## CARBYNE 2 EC (240 g/L)

**APPLICATION TIMING:**
a) Crop Stage: No restrictions on crop stage.
b) Weed Stage: 2 leaf stage and no later than 14 days following emergence.

**RATE:** 0.61 to 0.71 L/acre
Use the higher rate when wild oat density is 4 plants per square foot (40 plants per square metre) or more, when wild oats are not actively growing, or when wild oats have been injured by frost or wind.

**WATER VOLUME:** 18 L/acre

**PRESSURE:** 300 kPa (45 psi)

**NOZZLES:** Teejet 650067, 730067, 800067
Delavan LF.67-65, LF.77-73, LF.67-80
Spray Jet 65.067, TK.75, D.75
Direct spray 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Carbyne and other herbicides.

**RESTRICTIONS:**
- Rainfall: Do not apply when crop is wet with dew or rain. Rainfall within 15 minutes will reduce control.
- Grazing: Do not graze or harvest for forage within 5 weeks of application.
- Recropping: No restrictions the year after application.
- Storage: May be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Performs best under cool, moist weather conditions. Under adverse growing conditions control will be severely reduced.

**COMMENTS:** Due to the very narrow application timing and the need for strong crop competition for satisfactory control, opportunities for successful use of Carbyne are limited. For heavy infestations or variable leaf stages of wild oats use of an alternative herbicide is recommended.

## EXCEL (90 g/L)

**APPLICATION TIMING:**
a) Crop Stage: No leaf stage restriction but do not apply within 75 days of harvest.
b) Weed Stage: Wild oats, foxtail, barnyard grass, and volunteer barley 1 to 4 leaf stage (do not apply if total leaf number, including tillers, exceeds six); volunteer corn 2 to 10 inches (5.0 to 25 cm) tall.

**RATE:** 0.91 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Stainless steel 80° or 110° flat fan nozzles directed 45° forward.

**TANK MIXES:**
- Herbicides: May be tank mixed with 0.3 L/acre of Lontrel.
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Excel and other herbicides.

**RESTRICTIONS:**
- Preharvest: Do not apply within 75 days of harvest.
- Rainfall: Within 3 hours of application will reduce control.
- Grazing: Do not graze or harvest as forage prior to maturity.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Poor weed control will occur if prolonged cool (12° C or cooler) or very hot (28° C or warmer) temperatures prevail. Low relative humidity and dry soil conditions will also reduce control. Control of weeds which have tillered are particularly liable to escape under these conditions.

**COMMENTS:** Excel does not suppress quackgrass.

## *FUSILADE (250 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: 1 to 5 leaf stage. Do not apply within 80 days of harvest.

b) Weed Stage: 2 to 4 leaf stage except 2 to 5 leaf stage of volunteer corn, and 3 to 5 leaf stage of quackgrass (quackgrass must be less than 8 inches (20 cm) tall). Do not apply after wild oats or other annual grasses have tillered.

**RATES:**

| WEED | LEAF STAGE | RATE (L/acre) |
|---|---|---|
| volunteer corn | 2 - 5 | 0.243 |
| barnyard grass, volunteer wheat, volunteer barley | 2 - 4 | 0.324 |
| wild oats, proso millet | 2 - 4 | 0.405 |
| quackgrass | 3 - 5 | 0.405 |

**ADDITIVES:** Add Agral 90 at a rate of 0.1 L per 100 L of spray solution.

**WATER VOLUME:** 45 to 130 L/acre.
Use the higher water volume with heavy crop canopies or dense weed infestations.

**PRESSURE:** 200 to 275 kPa (30 to 40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**

- Herbicides: May be tank mixed with 0.3 to 0.61 L/acre of Lontrel.
- Fertilizer: None
- Insecticides: None

Allow 3 days between application of Fusilade and other herbicides. Fusilade must be applied first.

**RESTRICTIONS:**

- Preharvest: Do not apply within 80 days of harvest.
- Rainfall: Within 2 hours will reduce control.
- Grazing: Do not graze or harvest as forage.
- Recropping: Do not sow cereals, corn, or forage grasses within 60 days of application.
- Storage: May be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Reduced control will occur if grasses are under stress due to drought, flooding or excessively cool conditions.

**COMMENTS:** Experimental studies have shown that the active ingredient in this product may cause birth defects in laboratory animals. Women capable of bearing children should avoid contact with this product.

## *HOE-GRASS 284 (284 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: No leaf stage restriction but do not apply within 60 days of harvest.

b) Weed Stage: Wild oats, foxtail and barnyard grass 1 to 4 leaf stage and prior to tillering; Persian darnel 1 to 3 leaf stage; volunteer corn 6 to 10 inches (15 to 25 cm) in height. Although registered for application up to the 5 leaf stage of wild oats, results at this late leaf stage are inconsistent and this use is not recommended.

**RATE:** 1.01 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** 80° flat fan directed 45° forward.

**TANK MIXES:**

- Herbicides: Hoe-Grass 284 at the increased rate of 1.13 L/acre may be tank mixed with Lontrel at 0.3 L/acre.
- Fertilizer: None
- Insecticides: Decis

Allow 4 days after application of Hoe-Grass 284 before application of other herbicides or fertilizers.

**RESTRICTIONS:**

- Preharvest: Do not apply within 60 days of harvest.
- Rainfall: Within 1 hour of application will reduce control.
- Grazing: Do not graze or harvest as forage prior to crop maturity.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Application under hot (above 27° C) or droughty conditions will result in reduced weed control.

**COMMENTS:** Hoe-Grass provides optimum results under cool, moist conditions and should be applied when the majority of the grassy weeds are in the 2 to 3 leaf stage for best results.

## *LONTREL (360 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: 3 to 6 leaf stage.

b) Weed Stage: annual weeds — 2 to 4 leaf stage; Canada thistle — after all thistles have emerged and when the majority are 4 inches (15 cm) tall but prior to bud stage.

**RATES:**

| Rate (L/acre) | Results |
|---|---|
| 0.3 | Top growth suppression of Canada thistle. Expect regrowth by fall. |
| 0.405 | Top growth control of Canada thistle. Expect regrowth next season. |
| 0.61 | Controls Canada thistle. Reductions in population may be evident next season. |
| 0.405 - 0.61 | Control of wild buckwheat and scentless chamomile. |

**WATER VOLUME:** 45 to 90 L/acre

**PRESSURE:** 200 to 275 kPa (30 to 40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**

- Herbicides: Lowest rate (0.3 L/acre) can be tank mixed with Hoe-Grass at 1.13 L/acre or with Excel. Higher rates (0.405 to 0.61 L/acre) of Lontrel may be tank mixed with Poast + Assist Oil Concentrate or Poast + Merge. Lontrel at 0.3 to 0.61 L/acre may be tank mixed with 0.405 L/acre of Fusilade.
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Lontrel and other herbicides.

**RESTRICTIONS:**

- Rainfall: Within 6 hours will reduce control.
- Grazing: Do not graze or harvest as forage.
- Recropping: Lontrel may affect succeeding crops. *See Table 24* for recropping information.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Poor control may occur if dry soil conditions prevail.

**COMMENTS:** Application to Canada thistle at the bud stage or later will result in poor control.

## *NaTA TCA (85%) see TCA*

## *POAST (184 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: No leaf stage restrictions but do not apply within 70 days of harvest.

b) Weed Stage: When the majority of the annual weeds are in the 2 to 5 leaf stage. Quackgrass 1 to 3 leaf.

**RATES:**

| WEED | RATE (L/acre) WITH ASSIST | RATE (L/acre) WITH MERGE |
|---|---|---|
| green or yellow foxtail, barnyard grass, proso millet, witchgrass and volunteer corn | 0.324 – 0.405 | 0.324 – 0.405 |
| wild oats | 0.57 – 0.65 | 0.57 – 0.65 |
| volunteer wheat and oats | 0.65 | 0.57 – 0.65 |
| volunteer barley | 0.65 – 0.77 | 0.57 – 0.65 |
| quackgrass suppression | 1.78 | 1.1 |

When a rate range is specified, use the higher rate for dense weed infestations.

**ADDITIVES:** Add Assist Oil Concentrate or Merge to all Poast treatments at 1 L per 100 L spray solution for annual weeds or at 2 L per 100 L spray solution for quackgrass. The use of Merge will provide more consistent annual grass control than use of Assist.

**WATER VOLUME:** 25 to 80 L/acre. Apply at least 45 L/acre if crop or weed growth is dense and when spraying quackgrass.

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Stainless steel 80° flat fan directed 45° forward.

**TANK MIXES:**

- Herbicides: May be tank mixed with 0.405 to 0.61 L/acre of Lontrel.
- Fertilizer: See Poast Power Pack recommendation for information on mixes with ammonium sulphate.
- Insecticides: None

Allow 4 days between application of Poast and other herbicides.

**RESTRICTIONS:**

- Preharvest: Do not apply within 70 days of harvest.
- Rainfall: Within 1 hour will reduce effectiveness.
- Grazing: Do not graze or harvest as forage in year of treatment.
- Recropping: A cultivation to a 4 inch (10 cm) depth is required 7 days prior to re-seeding Poast-treated fields to grass crops (such as corn, cereals or forage grasses) in the year of treatment. Allow a minimum of 14 days between application of Poast and seeding of grass crops.
- Storage: May be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Control will be reduced if weeds are not actively growing due to drought, flooding or prolonged cool (15°C or cooler) periods. Do not apply if grassy weeds are stressed more than 20 days due to lack of moisture.

**COMMENTS:** For quackgrass suppression, rhizomes must be thoroughly fragmented prior to seeding. If quackgrass is not growing actively at the time of application results will be poor.

## *POAST (184 g/L) + POWER PACK [AMMONIUM SULPHATE (400 g/L) AND ASSIST OIL CONCENTRATE]*

**APPLICATION TIMING:**

a) Crop Stage: No restrictions on leaf stage but do not apply within 70 days of harvest.

b) Weed Stage: 2 to 5 leaf stage of annual weeds; 1 to 3 leaf stage of quackgrass.

**RATE:** 0.57 L/acre Poast for annual grasses
1.1 L/acre Poast for quackgrass

**ADDITIVES:** Add 1.62 L/acre Ammonium Sulphate and Assist Oil Concentrate at 1 L per 100 L spray solution. For quackgrass suppression the rate of Assist may be increased to 2 L per 100 L spray solution.

**MIXING:** To mix, partially fill the tank with water, slowly add the Ammonium Sulphate, then add the Poast and finally, the Assist Oil Concentrate. Maintain agitation during mixing.

**WATER VOLUME:** 25 to 80 L/acre. For heavy weed infestations or when applying to quackgrass, increase water volumes to 45 to 80 L/acre.

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Stainless steel 80° flat fan nozzles directed 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: Mix only with the technical grade ammonium sulphate at the above rates.
- Insecticides: None

Allow 4 days between application Poast + Power Pack and other herbicides or fertilizers.

**RESTRICTIONS:**
- Preharvest: Do not apply within 70 days of harvest.
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or harvest as forage in year of treatment.
- Recropping: A cultivation to a 4 inch (10 cm) depth is required 7 days prior to re-seeding Poast-treated fields to grass crops (such as corn, cereals, forage grasses) in the year of treatment. Allow a minimum of 14 days between application of Poast and seeding of grass crops.
- Storage: Poast may be frozen but do not store the ammonium sulphate at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Control will be reduced if weeds are not actively growing due to drought, flooding or prolonged cool periods (15° C or cooler). Do not apply to grasses stressed more than 20 days due to lack of moisture.

**COMMENTS:** Since Ammonium Sulphate is corrosive do not allow spray mixture to stand and thoroughly clean sprayer after use. Optimum results are obtained under warm moist conditions. For quackgrass suppression, ensure that rhizomes are thoroughly fragmented by spring tillage prior to seeding.

## [illegible]

**APPLICATION TIMING:**
a) Crop Stage: 4 to 6 inches (10 to 15 cm).
b) Weed Stage: 1 to 2 leaf stage.

**RATE:** 1.81 kg/acre

**WATER VOLUME:** 45 to 60 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles with 50-mesh screens.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of TCA and other herbicides.

**RESTRICTIONS:**
- Rainfall: A light rainfall after application is beneficial for activation.
- Grazing: Do not graze for at least 24 hours.
- Storage: Bar-fox and NaTA TCA may be kept in cool, dry storage.

**ENVIRONMENTAL PRECAUTIONS:** Poor control of foxtail species can occur if dry soil conditions prevail.

**COMMENTS:** Control of foxtail with TCA is variable and depends on strong crop competition. For heavy infestations of green foxtail use of an alternative green foxtail herbicide is recommended.

# Triazine Tolerant Canola

## TABLE 13 SUMMARY OF TRIAZINE TOLERANT CANOLA RECOMMENDATIONS

Note: The ratings in this chart give general comparisons based on rates, timing, and other application instructions and precautions as outlined in this Guide.
Where two or more brand names are indicated, the weed may not appear on all labels. See Field Crops Chart for complete weed spectrum.

| HERBICIDE | Crop Tolerance | Barnyard Grass | Foxtail, Green and Yellow | Wild Oats | Buckwheat, Wild | Catchfly, Night Flowering | Chickweed | Cleavers | Cow Cockle | Cocklebur | Flixweed | Hemp Nettle | Kochia | Lamb's Quarters | Mustard, Wild | Pigweed, Red Root | Quackgrass | Russian Thistle | Shepherd's Purse | Smartweed, Annual Species | Stinkweed | Thistle, Sow (Perennial) | Thistle, Canada | Volunteer Barley | Volunteer Wheat | Volunteer Flax |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Avadex BW | E |  |  | G |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Bladex | G |  |  |  | G |  | G | G |  |  |  | F |  | G | G | F |  |  | G | G | G |  |  |  |  | F |
| Carbyne 2 EC | G |  |  | P |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Edge | G | E | E[3] | G | G |  | G | P | E |  |  | F | G | E |  | E |  | F |  | F |  |  |  | F | G |  |
| Excel | E | G | G | G |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | G |  |  |
| Excel + Bladex | G | G | G | G | G |  | G | G |  |  |  | F |  | G | G | F |  |  | G | G | G |  |  | G |  |  |
| Excel + Lontrel | G | G | G | G | F |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | F[1] | F[1] | G |  |  |
| Fortress | G |  | G[3] | G |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Fusilade | E | E |  | G |  |  |  |  |  |  |  |  |  |  |  |  | P[1] |  |  |  |  |  |  | E | E |  |
| Fusilade + Bladex | G | E |  | G | G |  | G | G |  |  |  | F |  | G | G | F | P[1] |  | G | G | G |  |  | E | E | F |
| Fusilade + Lontrel | G | E |  | G | F |  |  |  |  |  |  |  |  |  |  |  | P[1] |  |  |  |  | G[1] | E | E | E |  |
| Hoe-Grass 284 | G | G | G | G |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Hoe-Grass 284 + Lontrel | G | G | G | G | F |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | F[1] | F[1] |  |  |  |
| Lontrel | G |  |  |  | F |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | G[1] | E |  |  |  |
| Poast | E | E | E | E |  |  |  |  |  |  |  |  |  |  |  |  | F[1] |  |  |  |  |  |  | G | G |  |
| Poast + Bladex | G | E | E | E | G |  | G | G |  |  |  | F |  | G | G | F |  |  | G | G | G |  |  | G | G | F |
| Poast + Lontrel | G | E | E | E | F |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | G[1] | E | G | G |  |
| Rival/Treflan/Triflurex | E | G | G[3] | F | F |  | G |  | G |  |  |  |  | G |  | G |  | G[2] |  |  |  |  |  |  |  |  |
| Sencor (postemergence) | G |  |  |  |  |  | G |  |  |  |  | F |  | G | G | F |  |  | G | G | G |  |  |  |  |  |
| Sencor + Treflan/Rival | G | G | G[3] | F | F |  | G |  | G |  |  | F |  | G | G | G |  | G | G | G | G |  |  |  |  |  |
| TCA (Bar-Fox/NaTA TCA) | G |  | F |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**LEGEND**

|  | Crop Tolerance | Weed Control |
|---|---|---|
| E — Excellent | Consistently exhibits a high degree of tolerance over a wide range of growing conditions. | Consistently provides a high degree of control over a wide range of growing conditions. |
| G — Good | Exhibits acceptable crop tolerance under most growing conditions. | Provides acceptable control under most growing conditions. |
| F — Fair | Tolerance is variable depending on growing conditions. | Control is variable depending on growing conditions. |
| P — Poor | Tolerance is often unacceptable. | May provide some suppression but control is often unacceptable. |

[1] Top growth only, regrowth can be expected.
[2] Rival or Triflurex only.
[3] Will not control trifluralin resistant foxtail.

## Preplant Incorporated

Manitoba Agriculture does not recommend fall application of soil incorporated herbicides to soils which are subject to wind or water erosion. Fall application to summerfallow fields, to soils with light trash cover or to light textured soils may predispose the field to erosion by wind and water and is not recommended.

### AVADEX BW [illegible] AVADEX BW GRANULAR [illegible]

**APPLICATION TIMING:**
a) Crop Stage: preplant incorporated.
b) Weed Stage: preemergence.

**RATES:**

| PRODUCT | SOIL ORGANIC MATTER |  |  |
|---|---|---|---|
|  | Less than 2% | 2 – 4% | More than 4% |
| Fall Granular | 5.7 kg/acre | 6.9 kg/acre | 8.9 kg/acre |
| Spring Granular | 6.9 kg/acre | 6.9 kg/acre | 8.9 kg/acre |
| Fall Liquid* | not recommended | not recommended | not recommended |
| Spring Liquid | 1.72 L/acre | 1.72 L/acre | 2.23 L/acre |

*Application of liquid formulations in the fall may predispose fields to erosion and is not recommended.

Although registered for fall application, the application and incorporation requirements for the liquid formulation predisposes soils to erosion and its use in the fall is not recommended.

**APPLICATION:** Liquid – field sprayer
Granular – granular applicator

**WATER VOLUME:** 45 L/acre (liquid product only)

**PRESSURE:** 200 kPa (30 psi)

**NOZZLES:** Flat fan.

**INCORPORATION:** Two incorporations at right angles required for thorough mixing. The first incorporation should be completed as soon as possible on the day of spraying (liquid product) or within 48 hours of application (granular product). The second incorporation for the liquid may be done immediately after the first. For best results with the granular product delay the second incorporation at least 3 to 5 days. *Refer to Herbicide Incorporation section* for detailed incorporation instructions.

**TANK MIXES:**
- Herbicides: None

- Fertilizer: Avadex BW liquid may be applied using liquid fertilizer as a carrier (conduct a compatibility test before mixing), or sprayed on dry urea fertilizer (*refer to Herbicide Incorporation section* for mixing and spreading instructions).
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: Moisture is required for activation. Rainfall of at least 0.6 inches (1.5 cm) within 2 weeks of application is required for optimum results.
- Grazing: Do not graze or harvest as forage during the year of application.
- Recropping: Will damage domestic oats seeded within 21 months of application.
- Storage: Do not freeze the liquid formulation. The granular may be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Very dry soil conditions in spring or prolonged cool soil temperatures at time of wild oat germination will result in reduced control.

**COMMENTS:** Poor results may be expected from incomplete incorporation due to wet, cloddy soil or heavy trash. Ridges left by seeding may disrupt the treated layer and allow weed escapes. Spring application of the liquid formulation generally provides a higher level of control than does the granular formulation applied in the spring.

## EDGE DF (50%), EDGE GRANULAR (5%)

Caution: **Trifluralin-resistant green foxtail has developed in Manitoba. Edge will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:**

a) Crop Stage: preplant incorporated
b) Weed Stage: pre-emergence.

**RATES:**

| Product | SOIL TYPE | | | |
|---|---|---|---|---|
| | Light Textured Soils 2 - 6% Organic Matter | MEDIUM TO HEAVY TEXTURED SOILS | | |
| | | 2 - 4% Organic Matter | 4 - 6% Organic Matter | 6 - 15% Organic Matter |
| Spring Edge DF | 0.69 kg/acre | 0.69 kg/acre | 0.89 kg/acre | 1.13 kg/acre |
| Fall Edge Granular | Not Recommended* | 8.9 kg/acre | 11.3 kg/acre | 11.3 kg/acre |
| Spring Edge Granular | 6.9 kg/acre | 6.9 kg/acre | 11.3 kg/acre | 11.3 kg/acre |

* The two fall incorporations required will leave light soils vulnerable to wind or water erosion. This use is not recommended.

**Although Edge DF is registered for use in the fall, this use is not recommended as incorporation requirements may predispose fields to erosion.**

**APPLICATION:** Edge Granular - granular applicator
Edge DF - sprayer equipped with jet or perforated pipe agitation (Return line agitation is not sufficient).

**WATER VOLUME:** 45 L/acre (Edge DF only)

**PRESSURE:** 275 kPa (40 psi) (Edge DF only)

**NOZZLES:** Flat fan equipped with 50-mesh or coarser nozzle screens (Edge DF only).

**MIXING:** When using Edge DF, fill the tank half full with water and begin agitation. Slowly add the required amount of Edge DF. Continue vigourous agitation at all times. Do not add Edge DF over the sump opening as filter plugging may occur.

**INCORPORATION:** Two incorporations required at right angles for thorough mixing. The first incorporation must be done within 24 hours of spraying. When using Edge DF, the second incorporation may be done immediately after the first. When using the granular formulation, delay the second incorporation for 3 days after the first. If applying Edge Granular in the fall, both incorporations must be done in the fall to obtain satisfactory results. See *Herbicide Information* section for additional details on incorporation.

**TANK MIXES:**

- Herbicides: None
- Fertilizer: Edge DF may be tank mixed with liquid fertilizer. Conduct a compatibility test before mixing. Edge DF may also be impregnated onto dry bulk fertilizers. See *Herbicide Information* section for details on mixing and spreading.
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: No effect once incorporated.
- Grazing: Do not graze or harvest as forage prior to crop maturity.
- Recropping: Soil residues may affect subsequent crops. See *Table 24* for a list of susceptible crops.
- Storage: Store in a cool, dry place. May be frozen. Do not expose to prolonged heat or prolonged direct sunlight.

**ENVIRONMENTAL PRECAUTIONS:** Poor results can be expected if dry soil conditions prevail between application time and weed emergence.

**COMMENTS:** When using the fall-applied granular formulation, shallow spring tillage (separate from seedbed preparation and prior to seeding) is required to destroy existing weed growth and to warm the soil to activate the herbicide.

## FORTRESS ([illegible])

**Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Fortress will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:**
a) Crop Stage: preplant incorporated in fall between September 15 and freeze-up or in the spring, prior to seeding the crop.
b) Weed Stage: preemergence.

**RATES:**

| Organic Matter | Rate (kg/acre) | |
|---|---|---|
| | Spring | Fall |
| Less than 4% | 5.67 | 5.67 |
| 4 – 6% | 6.88 | 5.67 |
| Greater than 6% | 6.88 | 6.88 |

**APPLICATION:** Apply with a calibrated granular applicator.

**INCORPORATION:** Incorporate twice at right angles, no deeper than 2 inches (5 cm). First incorporation must be done within 24 hours of application. If using fall applications, second incorporation may be delayed until spring, or may be performed 3 to 5 days after the first incorporation. If using spring applications, delay the second incorporation 3 to 5 days after the first incorporation. Refer to *Herbicide Information* section for detailed incorporation instructions.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Moisture is required for activation. Rainfall of at least 0.6 inches (1.5 cm) within 2 weeks of seeding crop is required to ensure optimum results.
- Grazing: Do not graze or harvest for forage.
- Recropping: Fortress will leave a residue in the soil. Oats, sugar beets, and small seeded forage grasses may be injured if planted within 24 months of application.
- Storage: Store in a cool, dry place. May be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Very dry conditions in the spring or prolonged cold soil temperatures at the time of weed germination will result in reduced control.

**COMMENTS:** Poor results can be expected from incomplete incorporation due to wet, cloddy soil or surface trash. Ridges left at seeding may disrupt the treated layer and allow weed escapes.

## RIVAL ([illegible]), RIVAL 10 G (10%), TREFLAN EC ([illegible]), TREFLAN QR 5 (5%), TRIFLUREX ([illegible])

**Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Rival, Treflan or Triflurex will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:**
a) Crop Stage: preplant incorporated.
b) Weed Stage: preemergence.

**RATES:**

*Spring Applications*

| PRODUCT | SOIL TYPE | |
|---|---|---|
| | Light soils with less than 6% organic matter | Medium to heavy soils with 6–15% organic matter |
| Rival | 0.65 L/acre | 0.9 - 1.1 L/acre |
| Rival 10 G | 3.4 kg/acre | 4.45 - 5.7 kg/acre |
| Treflan EC | 0.61 L/acre | 0.81 - 1.05 L/acre |
| Treflan QR 5 | 6.9 kg/acre | 8.9 - 11.3 kg/acre |
| Triflurex | 0.81 L/acre | 1.1 L/acre |

*Fall Applications (September 1 to freeze-up)*

| PRODUCT | SOIL TYPE | |
|---|---|---|
| | Light soils with less than 6% organic matter | Medium to heavy soils with 6–15% organic matter |
| Rival 10 G | 4.45 kg/acre* | 5.7 - 6.9 kg/acre |
| Treflan QR 5 | 8.9 kg/acre* | 11.3 - 13.8 kg/acre |

*Application to light textured soils in the fall may predispose fields to wind and water erosion.

Where a rate range is specified use the higher rate if dense wild oat infestations are expected.
The granular formulation is better suited to fall application, the liquid to spring application. Although liquid formulations are registered for fall application this use is not recommended as incorporation requirements may predispose fields to erosion.

**APPLICATION:** Liquid – field sprayer
Granular – granular applicator

**WATER VOLUME:** 45 L/acre (liquid product only)

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan (liquid product only).

**INCORPORATION:** Two incorporations required at right angles for thorough mixing. The first incorporation must be completed within 24 hours of spraying. The second incorporation for the liquid may be done immediately after the first. When using the granular, delay the second incorporation for 3 days after the first. With fall applications the second incorporation may be delayed until the spring. *Refer to the Herbicide Incorporation section* for additional details.

**TANK MIXES:**
- Herbicides: Rival EC or Treflan EC may be tank mixed with Sencor 500 (consult tank mix recommendation for details).
- Fertilizer: May be applied with liquid fertilizer (eg. 28-0-0) as a carrier. Conduct a compatibility test before mixing. Rival EC or Treflan EC may be impregnated onto dry bulk fertilizer. See *Herbicide Information* section for details.
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: No effect once incorporated.
- Grazing: Do not graze or harvest for livestock feed in the year of treatment.
- Recropping: Rival, Treflan and Triflurex leave a residue in the soil which may affect subsequent crops. *See Table 24* for a list of susceptible crops.
- Storage: Do not freeze the liquid formulations. If stored below 5° C bring contents to 15° C for 24 hours and shake well before using. The granular products may be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Poor results will occur if dry conditions prevail at time of weed emergence.

**COMMENTS:** A shallow tillage in the spring prior to seeding is required to destroy existing weed growth and to warm the soil to activate the herbicide.

## RIVAL (500 g/L), TREFLAN EC (545 g/L) PLUS SENCOR 500 F (500 g/L)

**Caution: Apply to triazine tolerant varieties only.**

**Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Rival or Treflan plus Sencor will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:**
a) Crop Stage: preplant incorporated – spring only.
b) Weed Stage: preemergence.

**RATES:** When applying the Rival/Sencor mix, apply:

| Soil Organic Matter | Rival Rate | Sencor Rate |
|---|---|---|
| 2 – 6% | 0.65 L/acre | 0.172 – 0.223 L/acre |
| 6 – 10% | 0.89 – 1.1 L/acre | 0.223 – 0.344 L/acre |

When applying the Treflan/Sencor mix, apply:

| Soil Organic Matter | Treflan Rate | Sencor Rate |
|---|---|---|
| 2 – 6% | 0.61 L/acre | 0.172 – 0.223 L/acre |
| 6 – 10% | 0.81 – 1.05 L/acre | 0.223 – 0.344 L/acre |

Where a rate range is specified use the higher rate of Rival/Treflan if dense wild oat infestations are expected. Use the higher rates of Sencor on heavier textured soils.

Although registered for fall application, application and incorporation requirements predispose soils to erosion and this use is not recommended.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**MIXING:** Fill the spray tank ¼ to ⅓ full of water, then add the Sencor 500. Continue filling with water while adding the Rival or Treflan. Maintain constant agitation while mixing and applying.

**NOZZLES:** Flat fan nozzles with 50-mesh screens and filters.

**INCORPORATION:** Incorporate twice at right angles as soon as possible after spraying. The first incorporation must be completed within 24 hours of spraying. The second incorporation may be done immediately after the first or at any time prior to seeding. *See the Herbicide Incorporation section* for additional incorporation instructions.

**TANK MIXES:**
- Herbicides: Apply Sencor preplant incorporated only as a tank mixture with Rival or Treflan.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: No effect once incorporated.
- Grazing: Do not graze or harvest as forage in year of treatment.
- Recropping: Both Rival/Treflan and Sencor may affect succeeding crops in the rotation. Consult *Table 24* for detailed recropping.
- Storage: Do not freeze Rival or Treflan. Sencor may be frozen but must be rewarmed to room temperature and agitated thoroughly prior to use.

**ENVIRONMENTAL PRECAUTIONS:** Poor results will occur if dry conditions prevail between application and weed emergence.

**COMMENTS:** After harvest tillage practices that provide soil mixing may be helpful in reducing the chance of injury to subsequent crops.

### Postemergence

Triazine tolerant canola is extremely sensitive to broadleaf herbicides. Ensure that sprayers are thoroughly cleaned before using to apply herbicides to triazine tolerant canola. Consult the manufacturer for detailed instructions on cleaning sprayers.

## BLADEX and TCA

## BLADEX L (480 g/L)

**Caution: Apply to triazine tolerant varieties only.**

**APPLICATION TIMING:**
a) Crop Stage: 2 to 4 leaf stage.

b) Weed Stage: 2 to 4 leaf stage. Red root pigweed must be smaller than 2 inches (5 cm) tall. Cleavers must be in the 1 to 2 whorl stage. Volunteer flax must be 0.8 to 2.0 inches (2 to 5 cm) tall.

**RATE:** 1.21 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles with 50-mesh screens and filters.

**TANK MIXES:**
- Herbicides: May be mixed with Excel, Poast + Assist, Poast + Merge, or Fusilade. Refer to product labels for specific mixing instructions.
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Bladex L and other herbicides.

**RESTRICTIONS:**
- Rainfall: Within 2 hours will reduce control.
- Grazing: Do not graze or harvest for forage.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Application under hot, humid conditions will result in crop yellowing.

## *CARBYNE 2 EC (240 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: No restrictions on crop stage.
b) Weed Stage: 2 leaf stage and no later than 14 days following emergence.

**RATE:** 0.61 to 0.71 L/acre

Use the higher rate when wild oat density is 4 plants per square foot (40 plants per square metre) or more, when wild oats are not actively growing, or when wild oats have been injured by frost or wind.

**WATER VOLUME:** 18 L/acre

**PRESSURE:** 310 kPa (45 psi)

**NOZZLES:** Teejet 650067, 730067, 800067
Delavan LF.67-65, LF.77-73, LF.67-80
Spray Jet 65.067, TK.75, D.75
Direct spray 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Carbyne and other herbicides.

**RESTRICTIONS:**
- Rainfall: Do not apply when crop is wet with dew or rain. Rainfall within 15 minutes will reduce control.
- Grazing: Do not graze or harvest as forage within 5 weeks of application.
- Recropping: No restrictions the year after application.
- Storage: May be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Performs best under cool, moist weather conditions. Under adverse growing conditions control will be severely reduced.

**COMMENTS:** Due to the very narrow application timing and the need for strong crop competition for satisfactory control, opportunities for successful use of Carbyne are limited. For heavy infestations or variable leaf stages of wild oats use of an alternative herbicide is recommended.

## *EXCEL (90 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: No leaf stage restriction but do not apply within 75 days of harvest.
b) Weed Stage: Wild oats, foxtail, barnyard grass, and volunteer barley 1 to 4 leaf stage (do not apply if total leaf number, including tillers, exceeds six); volunteer corn 2 to 10 inches (5 to 25 cm) tall.

**RATE:** 0.91 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Stainless steel 80° or 110° flat fan nozzles directed 45° forward.

**TANK MIXES:**
- Herbicides: May be tank mixed with Bladex L or with 0.3 L/acre Lontrel.
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Excel and other herbicides.

**RESTRICTIONS:**
- Preharvest: Do not apply within 75 days of harvest.
- Rainfall: Within 3 hours of application will reduce control.
- Grazing: Do not graze or harvest as forage prior to maturity.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Poor weed control will occur if prolonged cool (12° C or cooler) or very hot (28° C or warmer) temperatures prevail. Low relative humidity and dry soil conditions will also reduce control. Control of weeds which have tillered are particularly liable to escape under these conditions.

**COMMENTS:** Excel does not suppress quackgrass.

## FUSILADE (250 g/L)

**APPLICATION TIMING:**

a) Crop Stage: 1 to 5 leaf. Do not apply within 80 days of harvest.

b) Weed Stage: 2 to 4 leaf stage except for 2 to 5 leaf stage of volunteer corn, and 3 to 5 leaf stage of quackgrass (quackgrass must be less than 8 inches (20 cm) tall). Do not apply after wild oats or other annual grasses have tillered.

**RATES:**

| WEED | LEAF STAGE | RATE (L/acre) |
|---|---|---|
| volunteer corn | 2 - 5 | 0.243 |
| barnyard grass, volunteer wheat, volunteer barley | 2 - 4 | 0.324 |
| wild oats, proso millet | 2 - 4 | 0.405 |
| quackgrass | 3 - 5 | 0.405 |

**ADDITIVES:** Add Agral 90 at a rate of 0.1 L per 100 L of spray solution.

**WATER VOLUME:** 45 to 130 L/acre. Use the higher water volume with heavy crop canopies or dense weed infestations.

**PRESSURE:** 200 to 275 kPa (30 to 40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**

- Herbicides: May be tank mixed with 0.3 to 0.61 L/acre of Lontrel or with Bladex L.
- Fertilizer: None
- Insecticides: None

Allow 3 days between application of Fusilade and other herbicides. Fusilade must be applied first.

**RESTRICTIONS:**

- Preharvest: Do not apply within 80 days of harvest.
- Rainfall: Within 2 hours will reduce control.
- Grazing: Do not graze or harvest as forage.
- Recropping: Do not sow cereals, corn, or forage grasses within 60 days of application.
- Storage: May be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Reduced control will occur if grasses are growing under stress due to drought, flooding or excessively cool conditions.

**COMMENTS:** Experimental studies have shown that the active ingredient in this product may cause birth defects in laboratory animals. Women capable of bearing children should avoid contact with this product.

## HOE-GRASS (284 g/L)

**APPLICATION TIMING:**

a) Crop Stage: No leaf stage restriction but do not apply within 60 days of harvest.

b) Weed Stage: Wild oats, foxtail and barnyard grass 1 to 4 leaf stage and prior to tillering; Persian darnel 1 to 3 leaf stage; volunteer corn 6 to 10 inches (15 to 25 cm) in height. Although registered for application up to the 5 leaf stage of wild oats, results at this late leaf stage are inconsistent and this use is not recommended.

**RATE:** 1.01 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** 80° flat fan directed 45° forward.

**TANK MIXES:**

- Herbicides: Hoe-Grass 284 at the increased rate of 1.13 L/acre may be tank mixed with Lontrel at 0.3 L/acre.
- Fertilizer: None
- Insecticides: Decis

Allow 4 days after application of Hoe-Grass 284 before applying other herbicides or fertilizers.

**RESTRICTIONS:**

- Preharvest: Do not apply within 60 days of harvest.
- Rainfall: Within 1 hour of application will reduce control.
- Grazing: Do not graze or harvest as forage prior to crop maturity.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Application under hot (above 27° C) or droughty conditions will result in reduced weed control.

**COMMENTS:** Hoe-Grass provides optimum results under cool, moist conditions and should be applied when the majority of the grassy weeds are in the 2 to 3 leaf stage for best results.

## LONTREL (200 g/L)

**APPLICATION TIMING:**

a) Crop Stage: 3 to 6 leaf stage.

b) Weed Stage: annual weeds – 2 to 4 leaf stage; Canada thistle – after all thistles have emerged and when the majority are 4 inches (10 cm) tall but prior to bud stage.

**RATES:**

| Rate (L/acre) | Results |
|---|---|
| 0.3 | Top growth suppression of Canada thistle. Expect regrowth by fall. |
| 0.405 | Top growth control of Canada thistle. Expect regrowth next season. |
| 0.61 | Controls Canada thistle. Reductions in population may be evident next season. |
| 0.405 - 0.61 | Control of wild buckwheat and scentless chamomile. |

**WATER VOLUME:** 45 to 90 L/acre

**PRESSURE:** 200 to 275 kPa (30 to 40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**

- Herbicides: Lowest rate (0.3 L/acre) can be tank mixed with Excel or with Hoe-Grass 284 at 1.13 L/acre. Higher rates of Lontrel (0.405 to 0.61 L/acre) may be tank mixed with Poast + Assist Oil Concentrate or Poast + Merge. Lontrel at 0.3 to 0.61 L/acre may be tank mixed with Fusilade.
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Lontrel and other herbicides.

**RESTRICTIONS:**

- Rainfall: Within 6 hours will reduce control.
- Grazing: Do not graze or harvest as forage.
- Recropping: Lontrel residues in the soil may affect succeeding crops. See *Table 24* for detailed recropping guidelines.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Poor control may occur if dry soil conditions prevail.

**COMMENTS:** Application to Canada thistle at the bud stage or later will result in poor control.

## *POAST (184 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: No leaf stage restrictions but do not apply within 70 days of harvest.
b) Weed Stage: When the majority of the annual weeds are in the 2 to 5 leaf stage. Quackgrass 1 to 3 leaf.

**RATES:**

| WEED | RATE (L/acre) WITH ASSIST | RATE (L/acre) WITH MERGE |
|---|---|---|
| green or yellow foxtail<br>barnyard grass, proso millet, witchgrass and volunteer corn | 0.324 - 0.405 | 0.324 - 0.405 |
| wild oats | 0.57 - 0.65 | 0.57 - 0.65 |
| volunteer wheat and oats | 0.65 | 0.57 - 0.65 |
| volunteer barley | 0.65 - 0.77 | 0.57 - 0.65 |
| quackgrass suppression | 1.78 | 1.1 |

Where a rate range is specified for a weed , use the higher rate for heavy infestations.

**ADDITIVES:** Add Assist Oil Concentrate or Merge to all Poast treatments. Use 1 L per 100 L spray solution for annual weeds, or 2 L per 100 L spray solution for quackgrass. The use of Merge will provide more consistent annual grass control than use of Assist.

**WATER VOLUME:** 25 to 80 L/acre. Apply at least 45 L/acre if crop or weed growth is dense and when spraying quackgrass.

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Stainless steel 80° flat fan directed 45° forward.

**TANK MIXES:**

- Herbicides: May be tank mixed with Lontrel at 0.405 to 0.61 L/acre.
  May be tank mixed with 1.21 L/acre of Bladex L.
- Fertilizer: None. See Poast Power Pack recommendation for information on mixtures with ammonium sulphate.
- Insecticides: None

Allow 4 days between application of Poast and other herbicides.

**RESTRICTIONS:**

- Preharvest: Do not apply within 70 days of harvest.
- Rainfall: Within 1 hour of application will reduce control.
- Grazing: Do not graze or harvest as forage prior to crop maturity.
- Recropping: A cultivation to a 4 inch (10 cm) depth is required 7 days prior to reseeding Poast-treated fields to grass crops (such as corn, cereals, or forage grasses) in the year of treatment. Allow a minimum of 14 days between application of Poast and seeding of grass crops.
- Storage: May be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Control will be reduced if weeds are not actively growing due to drought, flooding or prolonged cool (15° C or cooler) periods. Do not apply if grassy weeds are stressed for more than 20 days due to lack of moisture.

**COMMENTS:** For quackgrass suppression, rhizomes must be thoroughly fragmented prior to seeding. If quackgrass is not actively growing at the time of application results will be poor.

## *POAST (184 g/L) + POWER PACK [AMMONIUM SULPHATE (490 g/L) AND ASSIST OIL CONCENTRATE]*

**APPLICATION TIMING:**

a) Crop Stage: No leaf stage restrictions but do not apply within 70 days of harvest.
b) Weed Stage: 2 to 5 leaf stage of annual weeds; 1 to 3 leaf stage of quackgrass.

**RATE:** 0.57 L/acre Poast for annual grasses
1.1 L/acre Poast for quackgrass

**ADDITIVES:** Add 1.62 L/acre Ammonium Sulphate and Assist Oil Concentrate at 1 L per 100 L spray solution. For quackgrass, use 1 to 2 L Assist Oil Concentrate per 100 L spray solution.

**WATER VOLUME:** 25 to 80 L/acre. Increase water volume to 45 to 80 L/acre if applying to dense weed growth or quackgrass.

**NOZZLES:** Stainless steel 80° flat fan directed 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: Use only the technical grade ammonium sulphate at rates specified above.
- Insecticides: None

Allow 5 days after applying Sencor before application of Poast + Power Pack. Allow 4 days between application of Poast Power Pack and other herbicides or fertilizers.

**RESTRICTIONS:**
- Preharvest: Do not apply within 70 days of harvest.
- Rainfall: Within 1 hour of application will reduce control.
- Grazing: Do not graze or harvest as forage prior to crop maturity.
- Recropping: A cultivation to a 4 inch (10 cm) depth is required 7 days prior to reseeding Poast-treated fields to grass crops (such as corn, cereals, forage grasses) in the year of treatment. Allow a minimum of 14 days between application of Poast and seeding of grass crops.
- Storage: Poast may be frozen but do not store the ammonium sulphate at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Control will be reduced if weeds are not actively growing due to drought, flooding or prolonged cool periods (15° C or cooler). Do not apply to grasses stressed more than 20 days due to lack of moisture.

**COMMENTS:** Since Ammonium Sulphate is corrosive do not allow spray mixture to stand and thoroughly clean sprayer after use. Optimum results are obtained under warm, moist conditions. Do not tank mix Poast + Power Pack with broadleaf herbicides as severe crop injury may result. For quackgrass suppression ensure that rhizomes are thoroughly fragmented by spring tillage prior to seeding.

## *SENCOR 500 F (500 g/L), SENCOR 75 DF (75%)*

**Caution: Apply to triazine tolerant varieties only.**

**APPLICATION TIMING:**
- a) Crop Stage: No leaf stage restriction but do not apply within 75 days of harvest.
- b) Weed Stage: Up to 2 inches (5 cm) height or diameter.

**RATE:** Sencor DF – 0.111 kg/acre
Sencor 500 – 0.172 L/acre

**WATER VOLUME:** 70 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles with tips no finer than 8002 or TK 2 directed 45° forward. Use 50-mesh screens and filters.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 5 days between application of Sencor and other herbicides.

**RESTRICTIONS:**
- Preharvest: Do not apply within 75 days of harvest.
- Rainfall: Within 6 hours will reduce control.
- Grazing: Do not graze or harvest as forage within 70 days of treatment.
- Recropping: No restrictions the year following postemergence application.
- Storage: Both formulations may be frozen but if frozen Sencor 500 must be warmed to room temperature and agitated prior to use.

**ENVIRONMENTAL PRECAUTIONS:** Crop height reductions or yellowing will occur if high temperatures occur within 48 hours of application. Cold, cloudy weather or frost within 3 days of application will also aggravate injury.

## *TCA [Bar-fox (83%), NaTA TCA (83%)]*

**APPLICATION TIMING:**
- a) Crop Stage: 4 to 6 inches (10 to 15 cm).
- b) Weed Stage: 1 to 2 leaf stage.

**RATE:** 1.81 kg/acre

**WATER VOLUME:** 45 to 60 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles with 50-mesh screens.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of TCA and other broadleaf herbicides.

**RESTRICTIONS:**
- Rainfall: Light rain after application is beneficial for activation.
- Grazing: Do not graze for at least 24 hours.
- Recropping: No restriction the year after application.
- Storage: Bar-fox and NaTA TCA may be kept in cool, dry storage.

**ENVIRONMENTAL PRECAUTIONS:** Poor control of foxtail species can occur if dry soil conditions prevail.

**COMMENTS:** Control of foxtail with TCA is variable and depends on strong crop competition. For heavy infestations of green foxtail use of an alternative green foxtail herbicide is recommended.

# Safflower

## EDGE DF (36%)

**WEEDS CONTROLLED:** see Field Crops chart.

**Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Edge will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:**
a) Crop Stage: preplant incorporated (spring only).
b) Weed Stage: preemergence

**RATES:**

| SOIL TYPE | RATE |
|---|---|
| Light textured soils (sands and sandy loams)<br>2–6% organic matter | 0.69 kg/acre |
| Medium to heavy textured soils<br>2–4% organic matter | 0.69 kg/acre |
| Medium to heavy textured soils<br>4–15% organic matter | 0.89 kg/acre |

Although registered for fall application, this use is not recommended as application and incorporation requirements predispose soils to erosion.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles with 50-mesh filters and screens.

**MIXING:** Use only sprayers equipped with jet or perforation pipe agitation. Return line agitation is not sufficient to keep this product in suspension. Fill the tank half full with water and begin agitation. Add half the required amount of Edge very slowly. Continue filling the tank with water, gradually adding the remaining amount of Edge DF. Continue vigorous agitation at all times. Avoid adding Edge DF over the sump opening as filter plugging may occur.

**INCORPORATION:** Requires two incorporations at right angles for thorough mixing. The first incorporation must be done within 24 hours of spraying. The second incorporation may be performed at any time prior to seeding. See *Herbicide Information* section for additional details.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: May be mixed with liquid fertilizer. Conduct a compatibility test before mixing. May be impregnated onto dry bulk fertilizers. See *Herbicide Information* section for details on mixing and spreading.
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: No effect once incorporated.
- Grazing: Do not graze or harvest as forage prior to crop maturity.
- Recropping: Soil residues may affect subsequent crops. See *Table 24* for a list of susceptible crops.
- Storage: Store in a cool, dry place. May be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Poor results can be expected if dry soil conditions prevail between application time and weed emergence.

## TREFLAN EC (545 g/L)

**WEEDS CONTROLLED:** *See Field Crops Chart.*

**Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Treflan will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION:**
a) Crop Stage: preplant incorporated
b) Weed Stage: preemergence

**RATES:** On light soils with 2 to 6 percent organic matter, use 0.61 L/acre. On medium to heavy soils with 6 to 15 percent organic matter, use 0.81 to 1.05 L/acre. If dense infestations of wild oats are expected on heavier soils, use 1.05 L/acre. Although Treflan EC is registered for use in the fall, this use is not recommended as incorporation requirements may predispose fields to erosion.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan

**INCORPORATION:** Two incorporations required at right angles for thorough mixing. The first incorporation must be completed within 24 hours of spraying. The second incorporation may be done immediately after the first. Refer to the *Herbicide Information* section for additional details.

**TANK MIXES:**
- Herbicides: None
- Fertilizers: May be tank mixed with liquid fertilizer (eg. 28-0-0) as a carrier. Conduct a compatibility test before mixing.
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: No effect once incorporated.
- Grazing: Do not graze or harvest for livestock feed.
- Recropping: Treflan leaves a residue in the soil which may affect subsequent crops. See *Table 24* for a list of susceptible crops.

- Storage: Do not freeze. If stored below 5° C bring contents to 15° C for 24 hours and shake well before using.

**ENVIRONMENTAL PRECAUTIONS:** Poor results will occur if dry conditions prevail at time of weed emergence.

## Soybeans

### Preplant Incorporated

Manitoba Agriculture does not recommend fall application of soil incorporated herbicides to soils which are subject to wind or water erosion. Fall application to summerfallow fields, to soils with light trash cover or to light textured soils may predispose the field to erosion by wind and water and is not recommended.

#### *AMIBEN (240 g/L) PLUS TREFLAN EC (545 g/L)*

**WEEDS CONTROLLED:** *See Field Crops Chart.*

Caution: **Trifluralin-resistant green foxtail has developed in Manitoba. Amiben plus Treflan will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:**
a) Crop Stage: preplant incorporated – spring only.
b) Weed Stage: preemergence.

**RATE:** Amiben at 3.74 L/acre mixed with Treflan at 0.61 to 0.81 L/acre.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**INCORPORATION** Apply and incorporate twice at right angles according to directions for incorporation of Treflan detailed in the *Herbicide Incorporation section*.

**TANK MIXES:**
- Herbicides: Apply Amiben only as a tank mix with Treflan.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Apply to a dry soil surface.
- Grazing: Do not graze or harvest as forage in year of treatment.
- Recropping: Treflan leaves a residue in the soil. See *Table 24* for susceptible crops.
- Storage: Do not freeze either Amiben or Treflan.

**ENVIRONMENTAL PRECAUTIONS:** Adequate moisture is critical to good weed control. If dry conditions prevail in the period following application, wild mustard will not be controlled by Amiben. If weed escapes occur, inter-row tillage will be necessary. Heavy rainfall prior to weed emergence may leach the herbicide below the root zone and result in poor control on light textured soils.

#### *DUAL (960 g/L)*

**WEEDS CONTROLLED:** green foxtail.

**APPLICATION TIMING:**
a) Crop Stage: preplant incorporated.
b) Weed Stage: preemergence.

**RATE:** 0.81 to 1.11 L/acre
Use the lower rate on light textured soils low in organic matter. Do not apply to soils with less than 1 per cent or more than 10 per cent organic matter.

**WATER VOLUME:** 60 L/acre

**PRESSURE:** 200 to 300 kPa (30 to 45 psi)

**NOZZLES:** Flat fan nozzles with 50-mesh screens and filters.

**INCORPORATION:** Apply to a smooth firm seed bed. Incorporate twice at right angles to a depth of 2 inches (5 cm). Consult the *Herbicide Incorporation section* for incorporation details.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: On light soils heavy rainfall may dilute the herbicide resulting in reduced weed control.
- Grazing: Do not graze or harvest as forage in year of treatment.
- Recropping: No restrictions the year after application.
- Storage: May be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Poor weed control will result if soils are dry at the time of emergence of weeds.

**COMMENTS:** To minimize crop injury, soybeans must be sown at least 1.5 inches (4 cm) deep.

#### *EDGE DF (50%), EDGE GRANULAR (5%)*

**WEEDS CONTROLLED:** See *Field Crops Chart.*

Caution: **Trifluralin-resistant green foxtail has developed in Manitoba. Edge will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

### Soybeans

**APPLICATION TIMING:**
a) Crop Stage: preplant incorporated
b) Weed Stage: preemergence

**RATES:**

| Product | SOIL TYPE | | | |
|---|---|---|---|---|
| | Light Textured Soils 2 - 6% Organic Matter | MEDIUM TO HEAVY TEXTURED SOILS | | |
| | | 2 - 4% Organic Matter | 4 - 6% Organic Matter | 6 - 15% Organic Matter |
| Spring Edge DF | 0.69 kg/acre | 0.69 kg/acre | 0.89 kg/acre | 1.13 kg/acre |
| Fall Edge Granular | Not Recommended* | 8.9 kg/acre | 11.3 kg/acre | 11.3 kg/acre |
| Spring Edge Granular | 6.9 kg/acre | 6.9 kg/acre | 11.3 kg/acre | 11.3 kg/acre |

* The two fall incorporations required will leave light soils vulnerable to wind or water erosion. This use is not recommended.

Although Edge DF is registered for use in the fall, this use is not recommended as incorporation requirements may predispose fields to erosion.

**APPLICATION:** Edge Granular - granular applicator
Edge DF - sprayer equipped with jet or perforated pipe agitation (return line agitation is not sufficient).

**WATER VOLUME:** 45 L/acre (Edge DF only)

**PRESSURE:** 275 kPa (40 psi) (Edge DF only)

**NOZZLES:** Flat fan equipped with 50-mesh or coarser nozzle screens (Edge DF only).

**MIXING:** When using Edge DF, fill the tank half full with water and begin agitation. Slowly add the required amount of Edge DF. Continue vigourous agitation at all times. Do not add Edge DF over the sump opening as filter plugging may occur.

**INCORPORATION:** Two incorporations required at right angles for thorough mixing. The first incorporation must be done within 24 hours of spraying. When using Edge DF, the second incorporation may be done immediately after the first. When using the granular formulation, delay the second incorporation for 3 days after the first. If applying Edge Granular in the fall, both incorporations must be done in the fall to obtain satisfactory results. See *Herbicide Information* section for details on mixing and spreading.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: Edge DF may be tank mixed with liquid fertilizer. Conduct a compatibility test before mixing. Edge DF may also be impregnated onto dry bulk fertilizers. See *Herbicide Information* section for additonal details on mixing and spreading.
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: No effect once incorporated.
- Grazing: Do not graze or harvest as forage prior to crop maturity.
- Recropping: Soil residues may affect subsequent crops. See *Table 24* for a list of susceptible crops.
- Storage: Store in a dry, cool place. May be frozen. Do not expose to prolonged heat or prolonged direct sunlight.

**ENVIRONMENTAL PRECAUTIONS:** Poor results can be expected if dry soil conditions prevail between application time and weed emergence.

**COMMENTS:** When using the fall-applied granular formulation, shallow spring tillage (separate from seedbed preparation and prior to seeding) is required to destroy existing weed growth and to warm the soil to activate the herbicide.

## *TREFLAN EC (545 g/L), TREFLAN QR 5 (5%)*

**WEEDS CONTROLLED:** *See Field Crops Chart.*

**Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Treflan will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:**
a) Crop Stage: preplant incorporated.
b) Weed Stage: preemergence.

**RATES:**

| Product | SOIL TYPE | |
|---|---|---|
| | Light soils less than 6% organic matter | Medium to heavy soils 6–15% organic matter |
| Spring Treflan EC | 0.61 L/acre* | 0.81 - 1.05 L/acre |
| Fall Treflan QR 5 | 8.9 kg/acre* | 11.3 - 13.8 kg/acre |
| Spring Treflan QR 5 | 6.9 kg/acre* | 8.9 - 10.9 kg/acre |

*Application to light textured soils may predispose fields to wind or water erosion.

Although registered for fall application, the application and incorporation requirements for liquid formulations predispose soils to erosion and their use is not recommended.

**APPLICATION:** Liquid – field sprayer
Granular – granular applicator

**WATER VOLUME:** 45 L/acre (liquid product)

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

## Soybeans

**INCORPORATION:** Two incorporations required at right angles for thorough mixing. The first incorporation must be completed within 24 hours of spraying. The second incorporation for the liquid may be done immediately after the first. When using the granular delay the second incorporation for 3 days after the first. With fall applications the second incorporation may be delayed until the spring. *See the Herbicide Incorporation section* for additional incorporation instructions.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: May be applied with some liquid fertilizers (eg. 28-0-0). Consult *Herbicide Incorporation section* for details. Conduct a compatibility test before mixing.
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: No effect once incorporated.
- Grazing: Do not graze or harvest as forage in year of treatment.
- Recropping: These products leave a residue which may affect subsequent crops. See *Table 24* for a list of susceptible crops.
- Storage: Do not freeze the liquid formulation.

**ENVIRONMENTAL PRECAUTIONS:** Poor results will occur if dry conditions prevail between application time and weed emergence.

**COMMENTS:** The liquid formulation is best suited for spring use. The granular formulation is best suited for fall.

Shallow tillage in the spring prior to seeding is required to destroy existing weed growth and to warm the soil to activate the herbicide.

### *TREFLAN EC (545 g/L) PLUS SENCOR 500 F (500 g/L)*

**Caution: Use only on KG 20 and McCall varieties.**

**WEEDS CONTROLLED:** *See Field Crops Chart.*

**Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Treflan plus Sencor will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:**

a) Crop Stage: preplant incorporated – spring only.
b) Weed Stage: preemergence.

**RATES:**

| Soil Organic Matter | Treflan (L/acre) | Sencor (L/acre) |
|---|---|---|
| 2 - 6% | 0.61 | 0.172 - 0.223 |
| 6 - 10% | 0.81 - 1.05 | 0.223 - 0.344 |

**Treflan and Sencor rates within these ranges vary according to soil type. Use the heavier rate on heavier soil types or on soils with higher organic matter.**

**Do not use on soils with pH values above pH 7.5 or on soils with less than 2 per cent or more than 10 per cent organic matter.**

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles with 50-mesh screens and filters.

**INCORPORATION:** Two incorporations required at right angles for thorough mixing. The first incorporation must be completed within 24 hours of spraying. The second incorporation for the liquid may be done immediately after the first or at any time prior to seeding. *See the Herbicide Incorporation section* for additional incorporation instructions.

**TANK MIXES:**
- Herbicides: Sencor must be applied as a tank mix with Treflan.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: No effect once incorporated.
- Grazing: Do not graze or harvest for forage in year of treatment.
- Recropping: Both Treflan and Sencor may affect succeeding crops. Consult *Table 24*, referring to recropping precautions for both products.
- Storage: Sencor may be stored at freezing temperatures. Treflan must not be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Delayed crop development or reduced yield may occur if seedlings are subjected to stress due to excessive moisture, drought, cold weather or deep planting. Injury increases with increasing soil pH.

**COMMENTS:** Although registered for fall application, application and incorporation requirements for liquid formulations predisposes soils to erosion and their use is not recommended.

## Postemergence

### *BASAGRAN (480 g/L)*

**WEEDS CONTROLLED:** *See rate table below.*

**APPLICATION TIMING:**

a) Crop Stage: after the first trifoliolate leaf stage.
b) Weed Stage: apply when weeds are at the height recommended in the rate table below.

### Soybeans

**RATES:**

| Weeds | Rate of Basagran when weeds listed below are within the recommended treatment height | | | |
|---|---|---|---|---|
| | 0.71 L/acre inches | (cm) | 0.91 L/acre inches | (cm) |
| **Annual Weeds** | | | | |
| Black nightshade | | | 0.2 – 0.7 | (0.5 – 1.8) |
| Cocklebur | 3 – 7 | (7.5 – 17.5) | 7 – 12 | (17.5 – 30.0) |
| Common chickweed | apply 1 to 3 weeks after chickweed emergence | | | |
| Common groundsel | | | 2 – 4 | ( 5.0 – 10.0) |
| Common ragweed | | | 1 – 2 | ( 2.5 – 5.0) |
| Corn spurry | | | 1 – 4 | ( 2.5 – 10.0) |
| Hairy galinsoga | | | 2 – 3 | ( 5.0 – 7.5) |
| Lady's thumb | 1 – 3 | ( 2.5 – 7.5) | 3 – 8 | ( 7.5 – 20.0) |
| Lamb's quarters | | | 0.5 – 1.0 | ( 1.3 – 2.5) |
| Purslane | | | 1 – 2 | ( 2.5 – 5.0) |
| Red root pigweed | | | 0.5 – 1.25 | ( 1.3 – 3.2) |
| Russian thistle | | | 1 – 3 | ( 2.5 – 7.5) |
| Venice mallow | 1 – 2 | ( 2.5 – 5.0) | 2 – 4 | ( 5.0 – 10.0) |
| Wild mustard | 1 – 5 | ( 2.5 – 12.5) | 5 – 10 | (12.5 – 25.0) |
| **Perennial Weeds** | – repeat application 7 to 10 days after first application | | | |
| Canada thistle | 6 – 8 | (15 – 20 ) | more than 8 | (more than 20) |
| Yellow nutsedge | 6 – 8 | (15 – 20 ) | more than 8 | (more than 20) |

**ADDITIVES:** Add Assist at 0.5 to 1.0 L per 100 L spray mixture. If hot, humid conditions prevail (above 28° C and 80% relative humidity) use only the lower rate of Assist.

**WATER VOLUME:** 80 to 160 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Standard flat fan nozzles capable of delivering high water volumes.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Basagran and other herbicides, fertilizers or insecticides.

**RESTRICTIONS:**
- Rainfall: Within 8 hours will reduce control.
- Grazing: Do not graze or harvest as forage.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Poor results will occur if temperatures are cool. Apply only if day time temperatures will exceed 21° C.

**COMMENTS:** Use at least 80 L/acre water to ensure thorough coverage with this contact herbicide. Top growth of thistles will be burnt off but rapid regrowth should be expected.

## FUSILADE (250 g/L)

**WEEDS CONTROLLED:** *See rate table below.*

**APPLICATION TIMING:**

a) Crop Stage: No leaf stage restrictions. Apply at least 90 days prior to harvest.

b) Weed Stage: 2 to 4 leaf stage and prior to tillering except 2 to 5 leaf stage of corn and 3 to 5 leaf stage of quackgrass.

**RATES:**

| WEEDS | LEAF STAGE | RATE (L/acre) |
|---|---|---|
| volunteer corn | 2 - 5 | 0.243 |
| barnyard grass, volunteer wheat, volunteer barley | 2 - 4 | 0.324 |
| wild oats, proso millet | 2 - 4 | 0.405 |
| green and yellow foxtail | 2 - 4 | 0.57 |
| quackgrass suppression | 3 - 5<br>but less than<br>8 inches (20 cm) tall | 0.81 |

**ADDITIVES:** Add Agral 90 at a rate of 0.1 L per 100 L of spray solution.

**WATER VOLUME:** 45 to 130 L/acre
Use the higher water volume with heavy crop canopies or dense weed infestations.

**PRESSURE:** 200 to 275 kPa (30 to 40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 3 days between application of Fusilade and other herbicides. Fusilade must be applied first.

**RESTRICTIONS:**
- Preharvest: Do not apply within 90 days of harvest.
- Rainfall: Within 2 hours will reduce control.
- Grazing: Do not graze or harvest as forage.
- Recropping: Do not sow cereals, corn, or forage grasses within 60 days of application.
- Storage: May be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Reduced control will occur if grasses are growing under stress due to drought, flooding or excessively cool conditions.

**COMMENTS:** Experimental studies have shown that the active ingredient in this product may cause birth defects in laboratory animals. Women capable of bearing children should avoid contact with this product. For quackgrass suppression ensure that rhizomes are thoroughly fragmented by spring tillage prior to seeding. Quackgrass plants more than 8 inches (20 cm) in height or which have reached the heading stage will not be controlled. Control will be reduced under hot or dry weather conditions.

## HOE-GRASS 284 (284 g/L)

**WEEDS CONTROLLED:** *See Field Crops Chart.*

**APPLICATION TIMING:**

a) Crop Stage: No leaf stage restriction but do not apply within 60 days of harvest.

b) Weed Stage: Wild oats, foxtail and barnyard grass 1 to 4 leaf stage and prior to tillering; Persian darnel 1 to 3 leaf stage; volunteer corn 6 to 10 inches (15 to 25 cm) in height.

Although registered for application up to the 5 leaf stage of wild oats, results at this late leaf stage are inconsistent and this use is not recommended.

**RATE:** 1.42 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** 80° flat fan directed 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days after application of Hoe-Grass 284 before applying other herbicides or fertilizers.

**RESTRICTIONS:**
- Preharvest: Do not apply within 60 days of harvest.
- Rainfall: Within 1 hour of application will reduce control.
- Grazing: Do not graze or harvest as forage prior to crop maturity.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Application under hot (above 27° C) or droughty conditions will result in reduced weed control.

**COMMENTS:** Hoe-Grass provides optimum results under cool, moist conditions and should be applied when the majority of the grassy weeds are in the 2 to 3 leaf stage for best results.

## *POAST (184 g/L)*

**WEEDS CONTROLLED:** *See rate table below.*

**APPLICATION TIMING:**

a) Crop Stage: No leaf stage restriction. Apply at least 80 days prior to harvest.

b) Weed Stage: When the majority of the annual weeds are in the 1 to 5 leaf stage; quackgrass — 1 to 3 leaf.

**RATES:**

| WEED | RATE (L/acre) WITH ASSIST | RATE (L/acre) WITH MERGE |
|---|---|---|
| green or yellow foxtail, barnyard grass, proso millet, witchgrass and volunteer corn | 0.324 – 0.405 | 0.324 – 0.405 |
| wild oats | 0.57 – 0.65 | 0.57 – 0.65 |
| volunteer wheat and oats | 0.65 | 0.57 – 0.65 |
| volunteer barley | 0.65 – 0.77 | 0.57 – 0.65 |
| quackgrass suppression | 1.78 | 1.1 |

**ADDITIVES:** Add Assist Oil Concentrate or Merge to all Poast treatments. Use 1 L per 100 L spray solution for annual weeds, 2 L per 100 L spray solution for quackgrass. The use of Merge will provide more consistent annual grass control than the use of Assist.

**WATER VOLUME:** 25 to 80 L/acre. Use 45 to 80 L/acre if spraying dense crop or weed growth or when treating quackgrass.

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Stainless steel 80° flat fan directed 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: See Poast Power Pack recommendation for information on mixes with ammonium sulphate.
- Insecticides: None

Allow 4 days between application of Poast and other herbicides.

**RESTRICTIONS:**
- Preharvest: Do not apply within 80 days of harvest.
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or harvest for forage in year of treatment.
- Recropping: A cultivation to a 4 inch (10 cm) depth is required 7 days prior to reseeding Poast-treated fields to grass crops (such as corn, cereals, forage grasses) in the year of treatment. Allow a minimum of 14 days between application of Poast and seeding of grass crops.
- Storage: May be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Control will be reduced if weeds are not actively growing due to drought, flooding or prolonged cool (15°C or cooler) periods. Do not apply to grasses stressed longer than 20 days due to lack of moisture.

**COMMENTS:** For quackgrass suppression, rhizomes must be thoroughly fragmented prior to seeding. Control may be enhanced by inter-row cultivation but do not cultivate sooner than 7 days after application.

## *POAST (184 g/L) + POWER PACK [AMMONIUM SULPHATE (490 g/L) AND ASSIST OIL CONCENTRATE]*

**WEEDS CONTROLLED:** *See Field Crops Chart.*

**APPLICATION TIMING:**

a) Crop Stage: No leaf stage restrictions but do not apply within 80 days of harvest.

b) Weed Stage: 2 to 5 leaf stage of annual weeds; 1 to 3 leaf stage of quackgrass.

**RATE:** 0.57 L/acre Poast for annual grasses
1.1 L/acre Poast for quackgrass

**ADDITIVES:** Add 1.62 L/acre Ammonium Sulphate and Assist Oil Concentrate at 1 L per 100 L spray solution. For quackgrass, use 2 L Assist Oil Concentrate per 100 L spray solution.

### Soybeans

**WATER VOLUME:** 25 to 80 L/acre. Increase water volume to 45 to 80 L/acre when spraying heavy infestations of weeds or when treating quackgrass.

**PRESSURE:** 275 kPa (40 psi)

**NOZZLE TYPE:** Stainless steel 80° flat fan nozzles directed 45° forward.

**TANK MIXES:**

- Herbicides: None
- Fertilizer: Use only the technical grade ammonium sulphate at rates specified above.
- Insecticides: None

Allow 4 days between application of Poast + Power Pack and other herbicides or fertilizers.

**RESTRICTIONS:**

- Preharvest: Do not apply within 80 days of harvest.
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or harvest as forage in year of treatment.
- Recropping: A cultivation to a 4 inch (10 cm) depth is required 7 days prior to reseeding Poast-treated fields to grass crops (such as corn, cereals, forage grasses) in the year of treatment. Allow a minimum of 14 days between application of Poast and seeding of grass crops.
- Storage: Poast may be frozen but do not store the ammonium sulphate at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Control will be reduced if weeds are not actively growing due to drought, flooding or prolonged cool periods (15° C or cooler). Do not apply to grasses stressed longer than 20 days due to lack of moisture.

**COMMENTS:** Since Ammonium Sulphate is corrosive do not allow spray mixture to stand and thoroughly clean sprayer after use. Optimum results are obtained under warm moist conditions. For quackgrass suppression ensure that rhizomes are thoroughly fragmented by spring tillage prior to seeding. Control may be enhanced by inter-row cultivation but do not cultivate sooner than 7 days after application.

# Sugar Beets

## TABLE 14 HERBICIDES FOR SUGAR BEETS

| HERBICIDES | Barnyard Grass | Cereal Grains | Foxtail, Green | Foxtail, Yellow | Wild Oats | Quackgrass | Buckwheat, Wild | Chickweed | Henbit | Kochia | Lamb's Quarters | Mustard, Wild | Nightshade | Pigweed, Prostrate | Pigweed, Red Root | Pigweed, Tumble | Purslane | Shepherd's Purse | Annual Smartweed Species, Lady's Thumb | Stinkweed |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Avadex | | | | | ● | | | | | | | | | | | | | | | |
| Betamix | | | ● | ● | | | ● | | | ● | ● | ● | ● | ● | ● | ● | | | | ● |
| Betanex | | | | | | | ● | | | | ● | ● | | | ● | | | | | ● |
| Carbyne 2 EC | | | | | ● | | | | | | | | | | | | | | | |
| Eptam | ● | ● | ● | ● | ● | S | | ● | ● | | ● | | ● | ● | ● | ● | ● | | | |
| Fusilade | ● | ● | ● | ● | ● | S | | | | | | | | | | | | | | |
| Gramoxone[a] | CONTROLS ANNUAL WEED SEEDLINGS AND TOP GROWTH OF PERENNIAL WEEDS | | | | | | | | | | | | | | | | | | | |
| Herbicide 273 | | | | | | | ● | | | | | | | | | | | | ● | |
| Hoe-Grass 284 | ● | | ● | ● | ● | | | | | | | | | | | | | | | |
| Laredo/Roundup/Wrangler[a] | CONTROLS ANNUAL WEED SEEDLINGS AND TOP GROWTH OF PERENNIAL WEEDS | | | | | | | | | | | | | | | | | | | |
| Nortron | ● | ● | ● | ● | ● | | | | | ● | ● | | | | ● | | ● | ● | ● | |
| Poast | ● | ● | ● | ● | ● | S | | | | | | | | | | | | | | |
| Ro-Neet | ● | | ● | ● | ● | | | | ● | | ● | | ● | | ● | | ● | | | |
| TCA (Bar-fox/NaTA TCA) | | | ● | ● | | | | | | | | | | | | | | | | |

**LEGEND**

a Apply to emerged weeds before or after planting but before sugar beets emerge

● Controlled by rates recommended for use in sugar beets

S Suppression only

Sugar beets are grown in Manitoba under contract to Manitoba Sugar Company. Crop production is closely supervised by its agricultural field staff. Consult with company personnel regarding any weed problems.

When one herbicide follows a previously applied treatment or the crop is in a stress condition, the rate of each subsequent treatment should be cautiously applied at the minimum recommended rate to avoid crop injury.

Herbicides requiring deep soil incorporation in spring are used at the risk of losing seedbed moisture for germination of the beet seed. This hazard tends to limit the use of chemicals that need spring incorporation in Manitoba. Fall applied herbicides avoid this problem but may predispose soils to erosion. Such herbicides may be followed at reduced rates by pre or postemergence herbicides in spring where necessary to control any escaped weeds. However, one is cautioned not to apply postemergence herbicides following preplant sprays until conditions are favourable for their safe use.

All rates given are for an overall application. Chemical use can be reduced to one-third when applying a seven inch (17.5 cm) band on the row. This is the general method of application for many of the chemicals.

## Preplant Incorporated

Manitoba Agriculture does not recommend fall application of soil incorporated herbicides to soils which are subject to wind or water erosion. Fall application to summerfallow fields or to soils with light trash cover or to light textured soils may predispose the field to erosion by wind and water and is not recommended.

***Avadex BW (400 g/L), Avadex BW Granular (10%)*** Controls wild oats. The liquid formulation is best suited for spring application, while the granular formulation is best suited for use in fall. Apply rate recommended in fall or before seeding in the spring.

| Application | SOIL ORGANIC MATTER | | |
|---|---|---|---|
| | Less than 2% | 2 - 4% | More than 4% |
| Fall Granular | 5.7 kg/acre | 6.9 kg/acre | 8.9 kg/acre |
| Spring Granular | 6.9 kg/acre | 6.9 kg/acre | 8.9 kg/acre |
| Fall Liquid* | not recommended | not recommended | not recommended |
| Spring Liquid | 1.72 L/acre | 1.72 L/acre | 2.23 L/acre |

*Application of liquid formulations in the fall may predispose fields to erosion and is not recommended.

### Sugar Beets

Apply liquid formulations in 45 L/acre water. Apply granular formulations using a suitable granular applicator. For fall applications, apply between September 15 and freeze-up.

Refer to the *Herbicide Incorporation* section for incorporation instructions. Fall application is recommended to avoid seedbed drying. Spring application can be done but caution is required to preserve seedbed moisture.

Avadex BW liquid may be applied with liquid fertilizer, or on a granular urea fertilizer. Refer to the *Herbicide Incorporation* section for instructions regarding application and use on dry urea fertilizer. For aerial recommendations see Table 19. Do not seed domestic oats the year after treatment with Avadex BW.

***Eptam 8-E (800 g/L)*** Although registered for fall application in sugar beets, application and incorporation requirements predispose soils to erosion and this use is not recommended.

***Ro-Neet 7.2 E (720 g/L)*** Controls wild oats, green and yellow foxtail and several broadleaf weeds. (Table 14) Apply in the spring only at 2.53 to 3.14 L/acre in 80 to 160 L/acre water. Use the lower rate on light textured soils. Incorporate thoroughly taking special precautions to avoid loss of seedbed moisture. See the *Herbicide Incorporation* section for specific incorporation instructions.

## Preplant Incorporated, Preemergence

***Nortron (180 g/L)*** Controls wild oats, green and yellow foxtail, barnyard grass, volunteer cereal grains and several broadleaf weeds. (Table 14) Apply 3.44 to 8.9 L/acre in 60 to 220 L/acre water and incorporate according to instructions in the *Herbicide Incorporation* section. Use the lower rate on light textured soils and the higher rate on heavier soils. Rainfall is required for activation when used as a preemergence treatment. Thoroughly till before planting the next crop. The addition of Bar-fox or NaTA TCA at 2.12 to 3.2 kg/acre product will improve control of green foxtail and barnyard grass. Addition of Ro-Neet at 1.52 to 2.12 L/acre to Nortron will improve control of lamb's-quarters.

## Preemergence

***Bar-fox*** see TCA.

***Gramoxone (200 g/L)*** Controls seedling weeds. Apply 1.11 to 2.23 L/acre in 120 to 220 L/acre water. Seedling weeds that have emerged before beets show above ground will be controlled by Gramoxone. Do not apply after beet emergence since Gramoxone burns all green vegetation.

***Laredo (356 g/L), Roundup (356 g/L), Wrangler (356 g/L)*** controls annual weeds. Apply 0.91 L/acre in 45 L/acre water, to actively growing grasses and broadleaf weeds less than six inches (15 cm) tall. If weeds are over six inches (15 cm) tall, apply 1.42 L/acre. Apply to emerged weeds before or after planting, but before beets show above the ground. Do not apply after beet emergence as these herbicides will kill all green vegetation. Allow at least three days after treatment before disturbing the soil.

***TCA [Bar-fox (83%), NaTA TCA (83%)]*** Controls green and yellow foxtail. Apply 2.53 to 4.0 kg/acre product NaTA TCA or 1.82 to 2.73 kg/acre Bar-fox in 45 L/acre water. Apply at planting time or immediately after. Precipitation is required for activation. Do not feed TCA treated beet tops to livestock.

## Postemergence

***Bar-fox*** see TCA.

**Betamix (150 g/L)** Controls green and yellow foxtail and several broadleaf weeds (Table 14). Apply 2.23 to 3.84 L/acre in 80 to 160 L/acre water before kochia, ragweed, nightshade and stinkweed reach the two leaf stage and prior to the four leaf stage of lamb's quarters, wild buckwheat, green and yellow foxtail, mustard species and pigweed species. For control of later germinating weeds make a second application of 2.23 to 2.83 L/acre. Allow at least seven days between first and second application. Apply to beets after the two true-leaf stage. Beets in the cotyledon stage may be severely injured.

For improved control of annual smartweed species and wild buckwheat, tank mix Betamix at 2.83 L/acre with Herbicide 273 at 0.61 to 1.32 L/acre. Use the higher rate of Herbicide 273 only on well established four to six leaf stage beets which are not under stress.

Avoid spraying during periods of bright sunshine, hot weather (30° C), cool overcast days, windy conditions or drought. Do not spray when beets are stressed from rapid climatic change, prior herbicide applications, insect or disease injury or close cultivation. Do not spray while dew is present or if rainfall is expected within six hours. Evening spraying is recommended to minimize injury on hot or bright days.

***Betanex (150 g/L)*** Controls several broadleaf weeds. (Table 14) Apply 2.23 to 3.84 L/acre in 80 to 160 L/acre water before wild buckwheat and stinkweed reach the two leaf stage and prior to the four leaf stage of red root pigweed, lamb's-quarters and wild mustard. For control of later germinating weeds, make a second application at 2.23 to 3.84 L/acre. Allow at least seven days between first and second application. For improved control of annual smartweed species and wild buckwheat, use Betanex at 2.83 L/acre tank mixed with Herbicide 273 at 0.61 to 1.32 L/acre. Use the higher rate of Herbicide 273 only on well established four to six leaf beets which are not under stress.

Avoid spraying during periods of bright sunshine, hot weather (30° C or warmer), cool overcast days, windy conditions or drought. Do not spray when beets are stressed from rapid climatic change, prior herbicide applications, insect or disease injury or close cultivation. Do not spray when dew is present or when rainfall is expected within 6 hours. Evening spraying is recommended to minimize injury on hot or bright days.

***Carbyne 2 EC (240 g/L)*** Registered for wild oat control. Apply in the 1 to 2 leaf stage of the weed but no later than 14 days following emergence. Apply 0.81 to 1.4 L/acre in 18 L/acre water. At the higher rate some suppression of wild buckwheat can be expected. Use the lower rate only if wild oat infestations are light, if growing conditions are excellent and if the wild oats have reached the 2 leaf stage within 10 days of emergence. Do not apply if the weeds are wet with dew or rain. If wild oat leaf stages are variable or if wild oat infestation is heavy use of an alternative wild oat herbicide is recommended.

**Fusilade (250 g/L)** Controls wild oats, green and yellow foxtail, volunteer cereals and suppresses quackgrass. See Table 14. Apply the rate appropriate for the weeds to be controlled according to the following table:

| WEED | LEAF STAGE | RATE (L/acre) |
|---|---|---|
| volunteer corn | 2 - 5 | 0.243 |
| barnyard grass, volunteer wheat, volunteer barley | 2 - 4 | 0.324 |
| wild oats, proso millet | 2 - 4 | 0.405 |
| green and yellow foxtail | 2 - 4 | 0.57 |
| quackgrass suppression | 3 - 5 | 0.81 |

Apply at the recommended leaf stage in 45 to 120 L/acre water using flat fan nozzles and a pressure of 30 to 40 psi (200 to 275 kPa). Add Agral 90 at a rate of 0.1 L/100 L of spray solution. Do not apply after tillering of annual grass weeds. For quackgrass suppression ensure that rhizomes are thoroughly fragmented by spring tillage prior to seeding. Quackgrass plants more than 8 inches (20 cm) in height or which have reached the heading stage will not be controlled. Fusilade effectiveness will be reduced when plants are stressed by lack of moisture, excess moisture, low temperature or very low relative humidity. Do not apply if rainfall is expected within 2 hours of application. Do not tank mix with other herbicides or fertilizers. Other herbicides must be applied at least three days after Fusilade. In row crops cultivation may be necessary to control grasses that emerge after treatment. Do not cultivate for at least five days after application. Do not reseed sensitive crops within 60 days of application. Avoid drift onto sensitive crops (corn, cereals, forage grasses and turf). Do not graze or feed treated crops during the year of treatment. Do not apply by air. Do not apply within 90 days of harvest.

**WARNING:** Experimental feeding studies have demonstrated that the active ingredient in this product can produce birth defects and other adverse effects in the developing fetus of rats. Women capable of bearing children should be particularly careful when handling this product. Occupational exposure to this product will be reduced by strict adherence to the handling precautions and use directions provided on the product label.

***Herbicide 273 (360 g/L)*** Controls several broadleaf weeds (Table 14). Apply 0.91 to 1.92 L/acre in 40 to 110 L/acre water. Apply when beets are in the four leaf stage and temperature is between 15° and 26°C. Use rates proportional to weed size and lower rates where herbicides were applied previously. Do not apply later than 40 days after beet emergence.

***Hoe-Grass 284 (284 g/L)*** Controls wild oats, green and yellow foxtail and barnyard grass. Apply 1.42 L/acre in at least 45 L/acre water with nozzles directed 45° forward. Spray at one to four leaf stage of the weeds before they tiller. Do not use flood jet nozzles. Application under hot (above 27°C) or droughty conditions will result in reduced weed control. Other herbicides for broadleaf weed control must be applied at least four days after Hoe-Grass 284 application. Do not apply if rain is expected within one hour.

***NaTA TCA (83%)*** see TCA.

***Poast (184 g/L)*** Controls several grassy weeds. See rate table below.

Apply:

| WEED | RATE (L/acre) WITH ASSIST | RATE (L/acre) WITH MERGE |
|---|---|---|
| green or yellow foxtail, barnyard grass, proso millet, witchgrass and volunteer corn | 0.324 – 0.405 | 0.324 – 0.405 |
| wild oats | 0.57 – 0.65 | 0.57 – 0.65 |
| volunteer wheat and oats | 0.65 | 0.57 – 0.65 |
| volunteer barley | 0.65 – 0.77 | 0.57 – 0.65 |
| quackgrass suppression | 1.78 | 1.1 |

Where a rate range is specified for a weed, use the higher rate to control heavy infestations.

Apply Poast with Assist Oil Concentrate or Merge at 1 L/100 L spray solution. The use of Merge will provide more consistent annual grass control than use of Assist. Apply with stainless steel 80° flat fan nozzles and use a minimum pressure of 35 psi (240 kPa). If weed infestation or crop canopy is dense, use 45 to 80 L/acre of water and 45 psi (300 kPa) nozzle pressures. Apply when the majority of annual grassy weeds are in the two to five leaf stage. For suppression of quackgrass, apply recommended rate of Poast plus Assist Oil Concentrate or Merge at 2 L/100 L spray solution at the one to three leaf stage of the weed. Rhizomes should be thoroughly fragmented by spring tillage prior to seeding. An inter-row cultivation should be performed no sooner than seven days after application to enhance control. Control may be reduced if grasses are not actively growing due to drought, flooding or prolonged cool periods (15°C or less). Do not use flood jet or hollow cone nozzles. For aerial recommendations see Table 19. Apply no later than 85 days prior to harvest.

A cultivation to a 4 inch (10 cm) depth is required 7 days prior to reseeding Poast-treated fields to grass crops (such as corn, cereals or forage grasses) in the year of treatment. Allow a minimum of 14 days between application of Poast and seeding of grass crops.

Do not tank mix with other herbicides. Allow at least a four day interval between application of Poast and broadleaf herbicides.

***Poast + Power Pack*** Controls volunteer cereals at reduced rates of Poast as well as annual grasses including green and yellow foxtail, barnyard grass and wild oats. Apply 0.57 L/acre Poast with 1.62 L/acre Ammonium Sulphate and Assist Oil Concentrate at 1 L/100 L spray solution when the grassy weeds are in the two to five leaf stage in 25 to 45 L/acre water. For heavy infestations use 45 to 80 L/acre water. To mix, partially fill the tank with water. While the agitation runs, add the Ammonium Sulphate to the tank first, then add the correct amount of Poast. Lastly, add the Assist and continue filling with water. Use 80° flat fan nozzles with pressures of 40 to 45 psi (275 to 300 kPa). Do not use flooding or hollow cone nozzles. Control may be reduced if grasses are stressed due to flooding, drought or prolonged cool weather (15°C or cooler).

A cultivation to a 4 inch (10 cm) depth is required 7 days prior to reseeding Poast-treated fields to grass crops (such as corn, cereals or forage grasses) in the year of treatment. Allow a minimum of 14 days between application of Poast and seeding of grass crops.

Apply no later than 85 days prior to harvest. Allow at least four days between application of Poast Power Pack and broadleaf weed herbicides.

**CAUTION:** *Ammonium Sulphate is corrosive to metal. Thoroughly clean the sprayer after using Poast + Power Pack. Do not allow the mixture to stand in the tank for lengthy periods of time.*

***TCA [Bar-fox (83%), NaTA TCA (83%)]*** Controls green and yellow foxtail. Apply 1.81 kg/acre product in 45 L/acre water. Apply before the foxtail is two inches (five cm) tall and before sugar beets have four leaves. Do not feed TCA treated beet tops to livestock. Control will be reduced under dry soil conditions.

# Sunflowers

## TABLE 15 SUMMARY OF SUNFLOWER RECOMMENDATIONS

Note: The ratings in this chart give general comparisons based on rates, timing, and other application instructions and precautions as outlined in this Guide.
Where two or more brand names are indicated, the weed may not appear on all labels. See Field Crops Chart for complete weed spectrum.

| HERBICIDE | Crop Tolerance | Barnyard Grass | Foxtail, Green and Yellow | Wild Oats | Buckwheat, Wild | Catchfly, Night Flowering | Chickweed | Cleavers | Cow Cockle | Cocklebur | Flixweed | Hemp Nettle | Kochia | Lamb's Quarters | Mustard, Wild | Pigweed, Red Root | Quackgrass | Russian Thistle | Smartweed, Annual Species | Stinkweed | Thistle, Sow (Perennial) | Thistle, Canada | Volunteer Barley | Volunteer Wheat |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Amiben + Treflan | G | G | G[4] | F | F |  | G |  | G |  |  |  |  | G | P | G |  | G | P | P |  |  |  |  |
| Carbyne 2 EC | G |  |  | P |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Edge | G | E | E[4] | G | G |  | G | P | E |  |  | F | G | E |  | E |  | F | F |  |  |  | F | G |
| Eptam | G | G | G | G |  |  | G |  |  |  |  |  |  | G |  | G |  |  |  |  |  |  | F | F |
| Excel | E | G | G | G |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | G |  |
| Fusilade | E | E | F | G |  |  |  |  |  |  |  |  |  |  |  |  | F[2] |  |  |  |  |  | E | E |
| Hoe-Grass 284[1] | G | G | G | G |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Mataven | E |  |  | G |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Rival/Treflan/Triflurex | E | G | G[4] | F | F |  | G |  | G |  |  |  |  | G |  | G |  | G[3] |  |  |  |  |  |  |

**LEGEND**

|  | Crop Tolerance | Weed Control |
|---|---|---|
| E — Excellent | Consistently exhibits a high degree of tolerance over a wide range of growing conditions | Consistently provides a high degree of control over a wide range of growing conditions |
| G — Good | Exhibits acceptable crop tolerance under most growing conditions | Provides acceptable control under most growing conditions |
| F — Fair | Tolerance is variable depending on growing conditions | Control is variable depending on growing conditions |
| P — Poor | Tolerance is often unacceptable | May provide some suppression but control is often unacceptable |

[1] Do not use on the variety Corona

[2] Top growth only, regrowth can be expected

[3] Rival or Triflurex only

[4] Will not control trifluralin resistant foxtail

## Preplant Incorporated

Manitoba Agriculture does not recommend fall application of soil incorporated herbicides to soils which are subject to wind or water erosion. Fall application to summerfallow fields, to soils with light trash cover or to light textured soils may predispose the field to erosion by wind and water and is not recommended.

### AMIBEN (240 g/L) PLUS TREFLAN EC (545 g/L)

**Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Amiben plus Treflan will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:**

a) Crop Stage: preplant incorporated.
b) Weed Stage: preemergence.

**RATE:** Amiben at 3.74 L/acre mixed with Treflan at 0.61 to 0.81 L/acre.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**INCORPORATION** Apply and incorporate twice at right angles according to directions for incorporation of Treflan outlined in the *Herbicide Incorporation section*.

**TANK MIXES:**

- Herbicides: Apply Amiben only as a tank mix with Treflan.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: Apply to a dry soil surface.
- Grazing: Do not graze or harvest as forage in year of treatment.
- Recropping: Treflan leaves a residue in the soil. See *Table 24* for susceptible crops.
- Storage: Do not freeze either Amiben or Treflan.

**ENVIRONMENTAL PRECAUTIONS:** Adequate moisture is critical to good weed control. If dry conditions prevail in the period following application, wild mustard will not be controlled by Amiben. If weed escapes occur, inter-row tillage will be necessary. Heavy rainfall prior to weed emergence may leach the herbicide below the root zone and result in poor control on light textured soils.

## [illegible]

**Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Edge will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:**
a) Crop Stage: preplant incorporated
b) Weed Stage: pre-emergence

**RATES:**

| Product | SOIL TYPE | | | |
|---|---|---|---|---|
| | Light Textured Soils | MEDIUM TO HEAVY TEXTURED SOILS | | |
| | 2 - 6% Organic Matter | 2 - 4% Organic Matter | 4 - 6% Organic Matter | 6 - 15% Organic Matter |
| Spring Edge DF | 0.69 kg/acre | 0.69 kg/acre | 0.89 kg/acre | 1.13 kg/acre |
| Fall Edge Granular | Not Recommended* | 8.9 kg/acre | 11.3 kg/acre | 11.3 kg/acre |
| Spring Edge Granular | 6.9 kg/acre | 6.9 kg/acre | 11.3 kg/acre | 11.3 kg/acre |

* The two fall incorporations required will leave light soils vulnerable to wind or water erosion. This use is not recommended.

Although Edge DF is registered for use in the fall, this use is not recommended as incorporation requirements may predispose fields to erosion.

**APPLICATION:** Edge granular - granular applicator
Edge DF - sprayer equipped with jet or perforated pipe agitation (return line agitation is not sufficient).

**WATER VOLUME:** 45 L/acre (Edge DF only)

**PRESSURE:** 275 kPa (40 psi) (Edge DF only)

**NOZZLES:** Flat fan equipped with 50-mesh or coarser nozzle screens (Edge DF only).

**MIXING:** When using Edge DF, fill the tank half full with water and begin agitation. Slowly add the required amount of Edge DF. Continue vigorous agitation at all times. Do not add Edge DF over the sump opening as filter plugging may occur.

**INCORPORATION:** Two incorporations required at right angles for thorough mixing. The first incorporation must be done within 24 hours of spraying. When using Edge DF, the second incorporation may be done immediately after the first. When using the granular formulation, delay the second incorporation for 3 days after the first. If applying Edge Granular in the fall, both incorporations must be done in the fall to obtain satisfactory results. See *Herbicide Information* section for additional details on incorporation.

**TANK MIXES:**
- Herbicides: None
- Fertilizers: Edge DF may be tank mixed with liquid fertilizer. Conduct a compatibility test before mixing. Edge DF may also be impregnated onto dry bulk fertilizers. See *Herbicide Information* section for details on mixing and spreading.
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: No effect once incorporated.
- Grazing: Do not graze or harvest as forage prior to crop maturity.
- Recropping: Soil residues may affect subsequent crops. See *Table 24* for a list of susceptible crops.
- Storage: Store in a dry, cool place. May be frozen. Do not expose to prolonged heat or prolonged direct sunlight.

**ENVIRONMENTAL PRECAUTIONS:** Poor results can be expected if dry soil conditions prevail between application time and weed emergence.

**COMMENTS:** When using the fall-applied granular formulation, shallow spring tillage (separate from seedbed preparation and prior to seeding) is required to destroy existing weed growth and to warm the soil to activate the herbicide.

## *EPTAM 8-E (800 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: preplant incorporated – spring only.
b) Weed Stage: preemergence.

**RATE:** 1.72 L/acre
Do not apply on soils with less than 3 per cent organic matter as severe crop injury may occur.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**INCORPORATION:** Incorporate immediately (within minutes) of application. Incorporate twice at right angles. *See Herbicide Incorporation section* for details.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: May be mixed with liquid fertilizers (eg. 28-0-0). Conduct a compatibility test before mixing. May be impregnated on dry bulk fertilizers (except ammonium nitrate). *See Herbicide Information section* for mixing and spreading instructions.
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: No effect once incorporated.
- Grazing: Do not graze or harvest as forage.
- Recropping: No restrictions the year after application.
- Storage: May be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Apply to a dry soil surface only. Crop injury can occur if stressful environmental conditions (cold, wet soils or drought or excessive heat) prevail at seeding or during crop emergence. To minimize crop injury delay seeding 10 days if these conditions prevail at the time of application.

**COMMENTS:** Although fall applications of this product are registered, incorporation requirements will leave soils vulnerable to erosion, and this use is not recommended. Immediate, thorough incorporation is essential for satisfactory results. Very cold or dry soil conditions during weed emergence will reduce control.

## *RIVAL (500 g/L), RIVAL 10 G (10%), TREFLAN EC (545 g/L), TREFLAN QR 5 (5%), TRIFLUREX (400 g/L)*

**Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Rival, Treflan or Triflurex will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**APPLICATION TIMING:**
a) Crop Stage: preplant incorporated.
b) Weed Stage: preemergence.

**RATES:**

*Spring Applications*

| Product | SOIL TYPE | |
|---|---|---|
| | Light soils with less than 6% organic matter | Medium to heavy soils with 6–15% organic matter |
| Rival | 0.65 L/acre | 0.9 - 1.1 L/acre |
| Rival 10 G | 3.4 kg/acre | 4.45 - 5.7 kg/acre |
| Treflan EC | 0.61 L/acre | 0.81 - 1.05 L/acre |
| Treflan QR 5 | 6.9 kg/acre | 8.9 - 11.3 kg/acre |
| Triflurex | 0.81 L/acre | 1.1 L/acre |

*Fall Applications (September 1 to freeze-up)*

| Product | SOIL TYPE | |
|---|---|---|
| | Light soils with less than 6% organic matter | Medium to heavy soils with 6–15% organic matter |
| Rival 10 G | 4.45 kg/acre* | 5.7 - 6.9 kg/acre |
| Treflan QR 5 | 8.9 kg/acre* | 11.3 - 13.8 kg/acre |

*Application to light textured soils in the fall may predispose fields to wind and water erosion.

**Where a rate range is specified, use the higher rates if heavy wild oat infestations are expected.**
**The granular formulation is better suited to fall application, the liquid to spring application. Although liquid formulations are registered for fall application, this use is not recommended as incorporation requirements may predispose fields to erosion.**

**APPLICATION:** Liquid – field sprayer
Granular – granular applicator

**WATER VOLUME:** 45 L/acre (liquid product only)

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan.

**INCORPORATION:** Two incorporations required at right angles for thorough mixing. The first incorporation must be completed within 24 hours of spraying. The second incorporation for the liquid may be done immediately after the first. When using the granular, delay the second incorporation for 3 days after the first. With fall applications the second incorporation may be delayed until the spring. *See the Herbicide Incorporation section* for detailed incorporation instructions.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: May be applied with liquid fertilizer (eg. 28-0-0) as a carrier. Conduct a compatibility test before mixing.Rival EC or Treflan EC may be impregnated onto dry bulk fertilizer. See *Herbicide Information* section for details.
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: No effect once incorporated.
- Grazing: Do not graze or harvest for livestock feed in the year of treatment.
- Recropping: Rival, Treflan and Triflurex leave a residue in the soil which may affect subsequent crops. See *Table 24* for a list of susceptible crops.
- Storage: Do not freeze the liquid formulations. If stored below 5° C bring contents to 15° C for 24 hours and shake well before using. Granular formulations may be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Poor weed control may occur if dry conditions prevail at the time of weed emergence.

**COMMENTS:** Shallow tillage prior to seeding is required to destroy existing weed growth and to warm soils to activate the herbicide.

## *CARBYNE 2 EC (240 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: No restrictions on crop stage.
b) Weed Stage: 2 leaf stage and no later than 14 days following emergence.

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**RATE:** 0.61 to 0.71 L/acre
Use the higher rate when wild oat density is 4 plants per square foot (40 plants per square metre) or more, when wild oats are not actively growing, or when wild oats have been injured by frost or wind.

**WATER VOLUME:** 18 L/acre

**PRESSURE:** 310 kPa (45 psi)

**NOZZLES:** Teejet 650067, 730067, 800067
Delavan LF.67-65, LF.77-73, LF.67-80
Spray Jet 65.067, TK.75, D.75
Direct spray 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Carbyne and other herbicides.

**RESTRICTIONS:**
- Rainfall: Do not apply when crop is wet with dew or rain. Rainfall within 15 minutes will reduce control.
- Grazing: Do not graze or harvest for forage within 5 weeks of application.
- Recropping: No restrictions the year after application.
- Storage: May be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Performs best under cool, moist weather conditions. Under adverse growing conditions control will be severely reduced.

**COMMENTS:** Due to the very narrow application timing and the need for strong crop competition for satisfactory control, opportunities for successful use of Carbyne are limited. For heavy infestations or variable leaf stages of wild oats use of an alternative herbicide is recommended.

## *EXCEL (90 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: No leaf stage restriction but do not apply within 100 days of harvest.
b) Weed Stage: Wild oats, foxtail, barnyard grass, and volunteer barley 1 to 4 leaf stage (Do not apply if total leaf number, including tillers, exceeds six); volunteer corn 2 to 10 inches (5 to 25 cm) tall.

**RATE:** 1.01 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Stainless steel 80° or 110° flat fan nozzles directed 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Excel and other herbicides.

**RESTRICTIONS:**
- Preharvest: Do not apply within 100 days of harvest.
- Rainfall: Within 3 hours of application will reduce control.
- Grazing: Do not graze or harvest as forage prior to maturity.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Poor weed control will occur if prolonged cool (12° C or cooler) or very hot (28° C or warmer) temperatures prevail. Low relative humidity and dry soil conditions will also reduce control. Control of weeds which have tillered are particularly liable to escape under these conditions.

**COMMENTS:** Excel does not suppress quackgrass.

## *FUSILADE (250 g/L)*

**APPLICATION TIMING:**
a) Crop Stage: No leaf stage restriction but do not apply within 120 days of harvest.
b) Weed Stage: 2 to 4 leaf stage and prior to tillering, except 2 to 5 leaf stage of volunteer corn and 3 to 5 leaf stage of quackgrass.

**RATES:**

| WEEDS | LEAF STAGE | RATE (L/acre) |
|---|---|---|
| volunteer corn | 2 - 5 | 0.243 |
| barnyard grass, volunteer wheat, volunteer barley | 2 - 4 | 0.324 |
| wild oats, proso millet | 2 - 4 | 0.405 |
| green and yellow foxtail | 2 - 4 | 0.57 |
| quackgrass suppression | 3 - 5 but less than 8 inches (20 cm) tall | 0.81 |

**ADDITIVES:** Add Agral 90 at a rate of 0.1 L per 100 L of spray solution.

**WATER VOLUME:** 45 to 130 L/acre
Use the higher water volume with heavy crop canopies or dense weed infestations.

**PRESSURE:** 200 to 275 kPa (30 to 40 psi)

**NOZZLES:** Flat fan.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 3 days between application of Fusilade and other herbicides. Fusilade must be applied first.

**RESTRICTIONS:**
- Preharvest: Do not apply within 120 days of harvest.
- Rainfall: Within 2 hours will reduce control.

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- Grazing: Do not graze or harvest as forage.
- Recropping: Do not sow cereals, corn, or forage grasses within 60 days of application.
- Storage: May be frozen.

**ENVIRONMENTAL PRECAUTIONS:** Reduced control will occur if grasses are stressed by drought, flooding or excessively cool conditions.

**COMMENTS:** Experimental studies have shown that the active ingredient in this product may cause birth defects in laboratory animals. Women capable of bearing children should avoid contact with this product. For quackgrass suppression ensure that rhizomes are thoroughly fragmented by spring tillage prior to seeding. Quackgrass plants more than 8 inches (20 cm) in height or which have reached the heading stage will not be controlled. Control will be reduced under hot or dry weather conditions.

## *HOE-GRASS 284 (284 g/L)*

**Caution: Do not apply to the variety Corona.**

**APPLICATION TIMING:**

a) Crop Stage: No leaf stage restriction but do not apply within 60 days of harvest.

b) Weed Stage: Wild oats, foxtail and barnyard grass 1 to 4 leaf stage and prior to tillering; Persian darnel 1 to 3 leaf stage; volunteer corn 6 to 10 inches (15 to 25 cm) in height. Although registered for application up to the 5 leaf stage of wild oats, results at this late leaf stage are inconsistent and this use is not recommended.

**RATE:** 1.01 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** 80° flat fan directed 45° forward.

**TANK MIXES:**

- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Hoe-Grass 284 and other herbicides or fertilizers.

**RESTRICTIONS:**

- Preharvest: Do not apply within 60 days of harvest.
- Rainfall: Within 1 hour of application will reduce control.
- Grazing: Do not graze or harvest as forage prior to crop maturity.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Application under hot (above 27° C) or droughty conditions will result in reduced weed control.

**COMMENTS:** Hoe-Grass provides optimum results under cool, moist conditions and should be applied when the majority of the grassy weeds are in the 2 to 3 leaf stage for best results.

## *MATAVEN L (62.5 g/L)*

**APPLICATION TIMING:**

a) Crop Stage: Up to the 6 leaf stage.

b) Weed Stage: 3 to 6 leaf stage.

**RATES:** Apply 2.02 to 2.63 L/acre. Use the highest rate for band applications or for dense weed infestations.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 300 kPa (45 psi)

**NOZZLES:** Flat fan nozzles directed 45° forward with 50-mesh screens and filters.

**TANK MIXES:**

- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: Within 2 hours will reduce control.
- Grazing: Do not graze or harvest as forage.
- Recropping: No restrictions the year after application.
- Storage: Must be kept in heated storage.

**ENVIRONMENTAL PRECAUTIONS:** Provides consistent control over a wide range of environmental conditions unless stressful conditions persist for 21 days or more.

**COMMENTS:** Treatment at early leaf stages will optimize crop yields by reducing competition. Application at the later leaf stages will provide better control of late emerging weeds. Wild oats in the 1 to 2 leaf stage will not be controlled.

# Perennial Weed Control

## Perennial Thistles

Control of Canada thistle and perennial sow thistle requires an integrated approach which includes the use of competitive crops, tillage, mowing, summerfallow and the use of spring or fall applied herbicides. For serious infestations, a control strategy should be planned for several consecutive seasons.

### After Harvest (Stubble Treatments)

Post-harvest applications of herbicides on thistles generally give inconsistent results. Regrowth the following spring may occur with all of the treatments listed below. Therefore, plan on sowing a competitive crop into heavily infested fields even if they are treated in the fall. Choose a crop in which effective in-crop treatments can be used for thistle control.

For fall treatments, spray only if thistles exhibit active new growth after harvest. Results will be poor if only mature leaves are present at the time of application or if thistles are growing slowly due to drought or other stressful environmental conditions. Some fall applied herbicides leave a residue in the soil which may affect subsequent crops. See individual recommendations for recropping restrictions.

***The following treatments will provide suppression of Canada thistle. Some regrowth can be expected the following spring. Fall tillage will improve control with these treatments.***

### *KIL-MOR (485 g/L)*

**APPLICATION TIMING:** When Canada thistles are actively growing and have 6 to 8 inches (15 to 20 cm) of regrowth.

**RATE:** 0.71 L/acre

**WATER VOLUME:** 45 L/acre

**COST:** $5.96/acre (1989)

**EXPECTED RESULTS:** Thistle control varies from 0 to 80 percent control the following spring.

**ENVIRONMENTAL PRECAUTIONS:** Results will be poor if thistles are growing slowly due to drought or cold conditions at the time of treatment or in the weeks following.

**COMMENTS:** A follow-up tillage is essential for this treatment. Wait approximately 3 weeks after treatment and cultivate. Ensure that adequate trash cover is maintained on the field so that erosion does not occur.

### *MCPA AMINE OR MCPA SODIUM SALT, 2,4-D AMINE*

**APPLICATION TIMING:** When Canada thistles are actively growing and have 6 to 8 inches (15 to 20 cm) of new growth.

**RATE:** 0.91 L/acre for 500 g/L formulations. For product volumes of other formulations, see *Table 21*.

**WATER VOLUME:** 45 L/acre

**COST:** MCPA amine - $3.90/acre (1989)
MCPA Sodium Salt - $3.32/acre (1989)
2,4-D amine- $3.32/acre (1989)

**EXPECTED RESULTS:** Thistle control varies from 0 to 80 percent control the following spring.

**ENVIRONMENTAL PRECAUTIONS:** Poor results can be expected if thistles are growing slowly due to drought or cool conditions at the time of treatment or in the weeks following.

**COMMENTS:** A follow-up tillage is essential for this treatment. Wait approximately 3 weeks after treatment and cultivate. Ensure that adequate trash cover is maintained to prevent soil erosion.

### *TARGET (400 g/L)*

**APPLICATION TIMING:** When Canada thistles are actively growing and have 6 to 8 inches (15 to 20 cm) of regrowth.

**RATE:** 0.81 L/acre

**WATER VOLUME:** 45 L/acre

**COST:** $6.52/acre (1989)

**EXPECTED RESULTS:** Thistle control varies from 0 to 80 percent control the following spring.

**ENVIRONMENTAL PRECAUTIONS:** Results will be poor if thistles are growing slowly due to drought or cold conditions at the time of treatment or in the weeks following.

**COMMENTS:** A follow-up tillage is essential for this treatment. Wait approximately 3 weeks after treatment and cultivate. Ensure that adequate trash cover remains so that erosion does not occur.

***The following treatments generally give a higher level of perennial thistle control but control may be inconsistent from season to season. Regrowth can occur the spring following fall applications. Fall tillage will improve control with these treatments. Due to treatment cost, patch treatment is recommended.***

## Perennial Thistles

### *AMITROL T (200 g/L)*

**APPLICATION TIMING:** Cut close to ground line and spray when thistles have regrown to 6 to 8 inches (15 to 20 cm) height. Do not apply after October 1.

**RATE:** 10.1 L/acre. Use higher rate when heavy infestations are present.

**WATER VOLUME:** 200 L/acre

**COST:** $60.00/acre (1989)

**EXPECTED RESULTS:** Thistle control varies from 30 to 94 percent the year after treatment.

**ENVIRONMENTAL PRECAUTIONS:** Drought or cold conditions at the time of application or in the weeks following will reduce control.

**COMMENT:** Cultivate 2 weeks after application. Ensure that adequate trash cover is maintained on the field so that erosion does not occur. Do not plant to any crop for 8 months after treatment as severe crop injury can occur.

### *BANVEL (480 g/L)*

**APPLICATION TIMING:** When at least 8 out of 10 thistle shoots have 4 to 6 inches (10 to 15 cm) of new growth. Do not apply after September 1.

**RATE:** 1.01 L/acre

**WATER VOLUME:** 45 L/acre

**COST:** $26.28/acre (1989)

**EXPECTED RESULTS:** Thistle control varies from 47 to 92 percent in the season following treatment.

**ENVIRONMENTAL PRECAUTIONS:** Poor results will occur if plants are not actively growing due to dry conditions or cold temperatures at the time of application or in the weeks following.

**COMMENTS:** Cultivate approximately 3 weeks after treatment. Ensure that adequate trash cover is maintained to prevent soil erosion. Grow only cereals, corn or soybeans the year after treatment. If application is made after September 1 or if dry soil conditions prevail after application, injury to crops (including cereals, corn or soybeans) may occur the spring following application.

### *LAREDO (356 g/L), ROUNDUP (356 g/L), WRANGLER (356 g/L)*

**APPLICATION TIMING:** Apply when Canada thistle has regrown to 8 to 10 inches (20 to 25 cm) tall.

**RATE:** 1.92 to 2.83 L/acre

**WATER VOLUME:** 45 L/acre

**COST:** $27.84 to $41.04/acre (1989)

**EXPECTED RESULTS:** Thistle control varies from 0 to 100 percent control in the season following application.

**ENVIRONMENTAL PRECAUTIONS:** Poor results will occur if plants have been damaged by heavy frosts prior to application, or within 5 days after application. Poor control can also be expected if plants are stressed by dry conditions or cold temperatures at the time of application or in the week following.

**COMMENTS:** Allow at least 5 days between application and subsequent tillage. Ensure that adequate trash cover is maintained to prevent soil erosion.

## Summerfallow

***Cultivate in the spring to control annual weeds and volunteer crops and to promote as much thistle growth as possible. After cultivation, allow the thistles to regrow and treat with one of the treatments listed below.***

***The following treatments will provide suppression of Canada thistle. Regrowth can be expected the season after summerfallow.***

### *KIL-MOR (485 g/L)*

**APPLICATION TIMING:** Apply when Canada thistle is in early bud stage.

**RATE:** 0.71 L/acre

**WATER VOLUME:** 45 L/acre

**COST:** $5.96/acre (1989)

**EXPECTED RESULTS:** Thistle control varies from 0 to 90 percent control the following spring.

**ENVIRONMENTAL PRECAUTIONS:** Results will be poor if thistles are growing slowly due to drought at the time of treatment or in the weeks following.

**COMMENTS:** Follow-up tillage is essential for this treatment. Wait approximately 4 weeks after treatment and resume cultivation.

### *MCPA AMINE or MCPA SODIUM SALT, 2,4-D AMINE*

**APPLICATION TIMING:** Apply when Canada thistle is in the early bud stage.

**RATE:** 0.91 L/acre for 500 g/L formulations. For product volumes of other formulations, see *Table 21*.

**WATER VOLUME:** 45 L/acre

**COST:** MCPA amine - $3.90/acre (1989)
MCPA Sodium Salt - $3.32/acre (1989)
2,4-D amine - $3.32/acre (1989)

**EXPECTED RESULTS:** Thistle control varies from 0 to 90 percent control the following spring.

**ENVIRONMENTAL PRECAUTIONS:** Poor results can be expected if thistles are growing slowly due to drought at the time of treatment or in the weeks following.

**COMMENTS:** Follow-up tillage is essential for this treatment. Wait approximately 3 weeks after treatment and resume cultivation.

### *TARGET (400 g/L)*

**APPLICATION TIMING:** Apply when Canada thistle is in the early bud stage.

**RATE:** 0.81 L/acre

**WATER VOLUME:** 45 L/acre

**COST:** $6.52/acre (1989)

**EXPECTED RESULTS:** Thistle control varies from 0 to 90 percent control the following spring.

**ENVIRONMENTAL PRECAUTIONS:** Results will be poor if thistles are growing slowly due to drought at the time of treatment or in the weeks following.

**COMMENTS:** Follow-up tillage is essential for this treatment. Wait approximately 3 weeks after treatment and resume cultivation.

***The following treatments generally give a higher level of perennial control. Due to treatment cost, patch treatment is recommended.***

### *BANVEL (480 g/L)*

**APPLICATION TIMING:** Spray when the majority of thistles are 6 to 10 inches tall (15 to 25 cm) and before the early bud stage.

**RATE:** 1.01 L/acre

**WATER VOLUME:** 45 L/acre

**COST:** $26.28/acre (1989)

**EXPECTED RESULTS:** Thistle control the following spring varies from 20 to 93 percent control.

**ENVIRONMENTAL PRECAUTIONS:** Results will be poor if thistles are stressed due to dry soil conditions or other stresses.

**COMMENTS:** Follow-up cultivation is essential for this treatment. Wait 3 weeks after treatment and resume cultivation. Grow only cereals, corn or soybeans the year after application. If soil moisture levels are extremely low after application, crop injury (including cereals, corn, soybeans) may occur.

### *BANVEL (480 g/L) PLUS ROUNDUP (356 g/L)*

**APPLICATION TIMING:** Spray when the majority of thistles are between 6 to 10 inches (15 to 25 cm) tall and before the bud stage.

**RATE:** Use 0.51 L/acre Banvel plus 0.69 L/acre Roundup plus 0.14 L/acre of non-ionic surfactant (such as Agral 90, Ag Surf or Triton XR).

**WATER VOLUME:** 45 L/acre

**COST:** $23.40/acre (1989)

**EXPECTED RESULTS:** Thistle control varies from 85 to 96 percent control the following spring.

**ENVIRONMENTAL PRECAUTIONS:** Results will be poor if thistles are growing slowly due to drought at the time of treatment or in the weeks following.

**COMMENTS:** A follow-up tillage is essential for this treatment. Wait 3 weeks before resuming summerfallow tillage.

### *LAREDO (356 g/L), ROUNDUP (356 g/L), WRANGLER (356 g/L)*

**APPLICATION TIMING:** Just prior to bud stage.

**RATE:** 1.92 to 2.83 L/acre for Canada thistle or 2.83 to 4.86 L/acre for perennial sow thistle.

**WATER VOLUME:** 20 to 45 L/acre

**COST:** $27.84 to $41.04 for Canada thistle (1989)
$41.04 to $70.47 for perennial sow thistle (1989)

**EXPECTED RESULTS:** Thistle control varies from 0 to 100 percent the following season.

**ENVIRONMENTAL PRECAUTIONS:** Poor results will occur if plants are under stress due to drought.

**COMMENTS:** Wait until at least 5 days after treatment for Canada thistle, 7 days for sow thistle, then resume normal summerfallow cultivation.

### *LAREDO (356 g/L), ROUNDUP (356 g/L), WRANGLER (356 g/L)*

**APPLICATION TIMING:** Apply on fall rosettes of Canada thistle (mid-August).

**RATE:** 1.01 L/acre

**WATER VOLUME:** 20 to 45 L/acre

**COST:** $14.50/acre (1989)

**EXPECTED RESULTS:** Thistle control varies from 71 to 100 percent control the season after treatment.

**ENVIRONMENTAL PRECAUTIONS:** Results will be poor if Canada thistle is under stress due to dry conditions at the time of application or in the weeks following.

**COMMENTS:** Conduct normal summerfallow tillage until mid-July. Allow a minimum of 5 weeks of regrowth of the Canada thistle before application. Apply the product, then wait a minimum of 10 days prior to resuming cultivation.

## *Quackgrass*

See the fact sheet *Ten Questions About Quackgrass* for integrated control reommendations.

Amitrol T and TCA are registered for quackgrass control but are not recommended as level of control is generally less than with the following recommendations.

### *LAREDO (356 g/L), ROUNDUP (356 g/L), WRANGLER (356 g/L)*

**APPLICATION TIMING:** Apply when quackgrass is 8 inches (20 cm) tall and actively growing. Applications may be made in either fall or spring.

**RATES:** Apply 2.83 L/acre if quackgrass is sodbound (Quackgrass may become sodbound if it has been left for 2 years or more in an undisturbed situation). Apply 1.92 L/acre to moderate infestations where long term control is required. Apply 1.01 L/acre for season-long control of light to moderate infestations.

**WATER VOLUME:** Do not use 'hard' water. Use only clean water at a volume of 20 to 45 L/acre. Use of the lower water volume will improve control. If water volumes of 65 L/acre or higher are used, the addition of a non-ionic surfactant such as Agral 90, Agsurf or Triton XR at 0.5 L per 100 L spray solution is required.

**COST:** $14.50/acre for season long control (1989)
$27.84 to $41.04 for long term control (1989)

**ENVIRONMENTAL PRECAUTIONS:** If a frost occurs, wait several days to determine if quackgrass has recovered. Quackgrass can be treated after mild frosts provided there are 3 to 4 green leaves actively growing at the time of application. Maximum weed control will occur when quackgrass is not under moisture stress and when temperatures are in the high-teens or low twenties celsius.

**COMMENTS:** Cultivation prior to application of these products will result in reduced control. Do not cultivate between harvest and treatment when using fall applications. If using spring applications of these products on fields which have been fall-tilled, delay application until the quackgrass reaches the 5-leaf stage. (This will occur approximately one month later on fall-tilled fields than in undisturbed fields.) Cultivation after application usually will improve control of quackgrass. Wait a minimum of 5 days after spraying, then cultivate.

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## Fall Control for Winter Annual Weeds

Fall tillage to control annual weeds should be shallow to avoid burying seeds below a depth of 3 inches (7.5 cm).

***Cobutox (400 g/L), Embutox 625 (625 g/L), 2,4-D Butyric 400 (400 g/L)*** Controls seedling narrow-leaved hawk's-beard in alfalfa. Apply 1.42 L/acre of Cobutox or 2,4-D Butyric 400 or 0.91 L/acre of Embutox 625 in 60 to 80 L/acre water after legume growth ceases.

***MCPA amine or mixtures of sodium and potassium salts or 2,4-D amine or LV ester*** Controls winter annuals such as flixweed, stinkweed and shepherd's purse. Apply 0.45 L/acre of formulations containing 500 g/L MCPA or 2,4-D in 45 L/acre water in late fall before freeze-up. Product volumes of other MCPA and 2,4-D formulations are given in Table 21.

# Chemical Fallow

TABLE 16 SUMMARY OF CHEMICAL FALLOW RECOMMENDATIONS

| HERBICIDE | Buckwheat, Wild | Cow Cockle | Flixweed | Foxtail Barley | Foxtail, Green | Kochia | Lady's Thumb | Lamb's Quarters | Mustard, Wild | Pigweed, Red Root | Russian Thistle | Stinkweed | Volunteer Cereals | Volunteer Rapeseed | Wild Oats |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Laredo/Roundup/Wrangler | | | | S | ● | | ● | | ● | | | ● | ● | ● | ● |
| Laredo/Roundup/Wrangler + Banvel | | ● | ●[1] | S | ● | ● | ● | ● | ● | | ● | ● | ● | ● | ● |
| Laredo/Roundup/Wrangler + Pardner | ●[1] | | | S | ● | | ● | | ● | | | ● | ● | ● | |
| Laredo/Roundup/Wrangler + 2,4-D amine | | | ● | S | ●[1] | ● | ● | | ● | ● | | ● | ● | ● | ●[1] |
| Sweep[2] | | | | S | ● | | | | | | | | ● | | ● |
| Sweep[2] + Afolan F/Lorox L[3] + MCPA amine | ● | ● | ● | S | ● | ● | ● | ● | ● | ● | | ● | ● | ● | ● |
| Sweep[2] + Buctril M | ● | ● | ● | S | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Sweep[2] + Banvel plus 2,4-D | ● | ● | ● | S | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Sweep[2] + MCPA | | | ● | S | ● | | | ● | ● | | | ● | ● | ● | ● |
| Sweep[2] + 2,4-D | | | ● | S | ● | | | ● | ● | | ● | ● | ● | ● | ● |

**LEGEND**

● Controlled by rates recommended for chemical fallow

S Suppression.

[1] Use 0.405 L/acre Laredo/Roundup/Wrangler.

[2] Sweep is a contact herbicide that will burn off above-ground green foliage. There can be regrowth if spray coverage is not complete, if weeds are beyond recommended stage of application or if perennial weeds (such as foxtail barley) are being treated.

[3] Do not apply Afolan F or Lorox L more than once during the season.

To ensure the success of a chemical summerfallow program, winter annual weeds (eg. stinkweed, shepherd's purse) must be controlled with 2,4-D or MCPA after harvest (preferred) or by an early spring application in the following year.

***Laredo (356 g/L), Roundup (356 g/L), Wrangler (356 g/L)*** Controls several grassy and broadleaf weeds. See Table 16. Apply 0.30 L/acre of Laredo, Roundup or Wrangler plus 0.142 L/acre of a non-ionic surfactant in 20 to 45 L/acre of clean water for annuals less than 3 inches (7.5 cm) tall or 0.405 L/acre of Laredo, Roundup or Wrangler plus 0.142 L/acre of a non-ionic surfactant in 20 to 45 L/acre of clean water for annuals greater than 3 inches (7.5 cm) tall.

Laredo, Roundup or Wrangler at the above rates can be tank mixed with 0.117 L/acre of Banvel or 0.51 L/acre Pardner or 0.49 L/acre of 2,4-D amine (500 g/L) plus 0.142 L/acre of a non-ionic surfactant in 20 to 45 L/acre of clean water. For rates of other 2,4-D amine formulations see Table 21. For weeds controlled see Table 16. For perennial weed control consult the *Perennial Weed Control Section* and *Special Weed Problems Section*. Do not apply when weeds are under stress conditions such as drought or extreme temperatures. Heavy rainfall within 2 hours after application may wash the chemical off the foliage and a repeat treatment may be required. Rainfall occurring within 6 hours after application may reduce effectiveness.

***Sweep (250 g/L)*** Controls annual grasses such as wild oats, green and yellow foxtail, and volunteer cereal grains. Apply 0.69 to 0.91 L/acre in 45 to 80 L/acre water. Apply when weeds are in the 2 to 4 leaf stage. Apply the 0.91 L/acre rate under dry conditions or if weed population is dense. Use 70 to 80 L/acre water when the weeds are in the 4 leaf stage. In most seasons two applications will be required for annual grass control, one in late May or June and another in late July or August.

If broadleaf weeds are present, Sweep may be tank mixed with a broadleaf herbicide such as 2,4-D, MCPA, Banvel plus 2,4-D, DyVel, Kil-mor, Buctril M, Afolan F or Lorox L plus MCPA at recommended rates. Do not apply Afolan F or Lorox L more than once during the season. See Table 16 for broadleaf weeds controlled with these tank mixes. Some of these herbicides leave residues which may affect growth of crops seeded in the following year; see Table 24 for crops which may safely be planted in the rotation.

# Zero Tillage

Weed control techniques under zero tillage systems are different than under conventional tillage. Under zero tillage, weed problems tend to shift from spring annual weeds to winter annual and perennial weed problems. Weeds of particular concern in zero tillage fields in Manitoba have included foxtail barley, bromegrass, dandelions, narrow-leaved hawk's beard, Canada thistle, sow thistle, and winter annual weeds such as flixweed and stinkweed.

In zero tillage crop production, weed control techniques rely heavily on herbicides since cultivation is not normally used. Selection of herbicides is limited to post-emergence products since incorporation of herbicides into the soil cannot be accommodated. Herbicide programs in zero tillage usually consist of: 1) fall treatments for control of winter annuals, quackgrass and other perennial weeds; 2) spring burnoff treatments to control germinated annual weeds prior to crop emergence; 3) selective treatments using post-emergence chemicals to control weeds in the growing crop.

### Fall Weed Control

***Laredo (356 g/L), Roundup (356 g/L), Wrangler (356 g/L)*** For season-long control of quackgrass, apply 1.01 L/acre after harvest to provide top growth control the following season. For season-long control of bromegrass increase the rate to 2.5 L/acre. Apply in 20 to 45 L/acre of clean water using flat fan nozzles when quackgrass or bromegrass are at least 8 inches (20 cm) tall and have 3 or 4 actively growing leaves. If more than 65 L/acre water volume is used, the addition of 0.5 L per 100 L of spray solution with a non-ionic surfactant such as Agral 90, Ag Surf or Triton XR is required. Repeat treatments in consecutive seasons may be required if infestations are dense on fields which have not been tilled for several seasons. Heavy rainfall within 2 hours after application may wash the chemical off the foliage and a repeat treatment may be required. Rainfall occuring within 6 hours after application may reduce effectiveness.

***MCPA or 2,4-D amines, esters or salts.*** Controls fall seedlings of several broadleaf weeds. Apply in fall when the majority of weeds have emerged, but prior to freeze-up. Apply 500 g/L formulations of MCPA or 2,4-D at the rates listed below. Product volumes of other MCPA or 2,4-D formulations are given *in Table 21*.

| Rate (L/acre) | Species Controlled |
|---|---|
| 0.34 - 0.45 | flixweed, stinkweed, shepherd's purse |
| 0.45 - 0.91 | above weeds plus narrow-leaved hawk's beard |
| 0.91 | above weeds plus dandelions |

### Spring Burnoff Treatments

***Gramoxone (200 g/L)*** Controls annual grasses and broadleaf weeds. Spray at least 3 days before crop emergence. If weeds are less than 2 inches (5 cm) tall, apply 1.12 L/acre in 120 to 445 L/acre clean water. If weeds are taller than 2 inches (5 cm) increase the rate of Gramoxone to 2.22 L/acre.

***Laredo (356 g/L), Roundup (356 g/L), Wrangler (356 g/L)*** Controls wild oats, green foxtail, lady's thumb, stinkweed, volunteer cereals, wild mustard and volunteer rapeseed. Apply when weeds are less than 6 inches (15 cm) tall in cereal cropping systems. Application in wheat, barley and oats can be made prior to seeding and before the crop emerges. Apply 0.45 L/acre with 0.142 L/acre of non-ionic surfactant (Ag Surf, Triton XR, Agral 90). Spray in 20 to 45 L/acre of clean water. Since these products do not provide residual weed control, application too far in advance of seeding will allow weeds to emerge between application and crop emergence. Heavy rainfall within 2 hours after application may wash the chemical off the foliage and a repeat treatment may be required. Rainfall occuring within 6 hours after application may reduce effectiveness.

***Laredo (356 g/L), Roundup (356 g/L), Wrangler (356 g/L) plus Pardner (280 g/L)*** Controls green foxtail, volunteer cereals, lady's thumb, lamb's quarters, wild mustard, volunteer rapeseed, wild buckwheat and stinkweed. Apply 0.45 L/acre Laredo or Roundup or Wrangler and 0.142 L/acre non-ionic surfactant (Triton XR, Ag Surf or Agral 90) tank mixed with 0.57 L/acre Pardner and apply in 45 L/acre water. Heavy rainfall within 2 hours after application may wash the chemical off the foliage and a repeat treatment may be required. Rainfall occuring within 6 hours after application may reduce effectiveness.

# Seedling Forage Crops

Plan your weed control program before seeding forage crops. Consider the weeds found in the field and control measures available. Perennial crops reduce flexibility and require long term planning. Effective weed control before planting and in the establishment year may reduce weed problems for the remainder of the stand life.

Most forage crops are competitive and suppress weed growth. Once the forage is established, annual weeds are unlikely to become a problem. Perennial weeds may be a problem and shorten the life of the forage stand. Control perennial weeds before establishment of forage crops or plan for adequate control in the crop.

When mixed stands of grasses and legumes are grown, herbicide choice is limited. Be sure the herbicide can be used on all forages in the mixture. For grass-legume mixes, use of broadleaf herbicides will be most limited by the legume while use of herbicides for grassy weed control will be most restricted by the forage grass.

Cover crops also limit herbicide use. Be sure the herbicide is recommended for both the forage and cover crop. The *Forage Crops Chart* contains a summary of recommended herbicides.

## *Seedling Legumes*

### Preplant or Preemergence (but postemergence to weeds)

### [illegible]

**WEEDS CONTROLLED:** See *Table 29*

**APPLICATION TIMING:**
- a) Crop Stage: preplant or pre-emergence
- b) Weed Stage: when annual weeds are cotyledon to 6 inches (15 cm) tall and quackgrass is 8 inches (20 cm) tall

**RATES:** 0.91 to 1.42 L/acre. Use the nigher rates if annual weeds are 6 inches (15 cm) tall. Use 1.01 L/acre for season-long suppression of quackgrass.

**WATER VOLUMES:** Use clean water 45 to 120 L/acre. Do not use 'hard' water. Use the higher water volumes if weed growth is dense. If more than 60 L/acre water volume is used, the addition of a non-ionic surfactant (such as Agral 90, Ag Surf or Triton XR) at 0.5 L per 100 L spray solution is recommended.

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 6 hours of application will result in reduced control.
- Grazing: Do not graze treated plants.
- Recropping: No effects on crops sown into these treatments
- Storage: May be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Best performance occurs when weeds are actively growing, when temperatures are in the high 'teens' or low 'twenties' celsius and when weeds are not under drought stress.

### Preplant Incorporated

Manitoba Agriculture does not recommend fall application of soil incorporated herbicides to soils which are subject to wind or water erosion. Fall application to summerfallow fields or to soils with light trash cover or to light textured soils may predispose the field to erosion by wind and water and is not recommended.

### AVADEX BW [illegible] AVADEX BW GRANULAR [illegible]

**WEEDS CONTROLLED:** Wild oats

**FORAGE LEGUMES:** Alfalfa, bird's-foot trefoil, alsike clover, red clover, sweet clover

**COVER CROPS:** Barley, wheat, flax or canola must be sown with the legumes

**APPLICATION TIMING:**
- a) Crop Stage: Preplant incorporated for oilseeds, preplant or postplant incorporated for barley or wheat. The legume crop must be sown after the herbicide has been applied and incorporated.
- b) Weed Stage: preemergence

**RATES:** Apply according to rate tables given for the particular cover crop to be used. (See *'Cereals'* or *'Oilseeds'* sections)

**APPLICATION:** Liquid – field sprayer
Granular – granular applicator

**WATER VOLUME:** 45 L/acre (liquid product only)

**PRESSURE:** 200 kPa (30 psi)

**NOZZLES:** Flat fan

**INCORPORATION:** Two incorporations are required. See *Herbicide Information* section for details on incorporation.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: Avadex BW may be applied with liquid fertilizer as a carrier or may be sprayed onto dry urea fertilizer. Consult the *Herbicide Information* section for details.
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: No effect once applied and incorporated.
- Grazing: Do not graze or harvest for livestock feed in the year of treatment.
- Recropping: Oats will be injured if sown the year after application.
- Storage: Store liquid above freezing. Store granular in a dry, cool place.

**ENVIRONMENTAL PRECAUTIONS:** Cold or dry soil conditions at the time of wild oat emergence will result in reduced control.

**COMMENTS:** Poor results will occur if excessive trash or wet or cloddy soils lead to poor incorporation. Ridges left by seeding may disrupt the treated layer and allow weed escapes. Liquid formulations applied in spring generally give better results than granular formulations applied in spring.

## EDGE DF (50%)

**Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Edge DF will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**WEEDS CONTROLLED:** See *Table 29*.

**FORAGE LEGUMES:** Seedling alfalfa for seed.

**COVER CROPS:** May be used with alfalfa sown alone or with a Canola cover crop.

**APPLICATION TIMING:**
a) Crop Stage: Preplant incorporated (spring only).
b) Weed Stage: preemergence

**RATES:**

| SOIL TYPE | RATE |
|---|---|
| Light textured soils (sands and sandy loams) 2-4% organic matter | 0.69 kg/acre |
| Medium to heavy textured soils 4-6% organic matter | 0.69 kg/acre |
| Medium to heavy textured soils 6-15% organic matter | 0.89 kg/acre |

Although registered for fall application, this use is not recommended as application and incorporation requirements predispose soils to erosion.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles with 50-mesh filters and screens.

**MIXING:** Use only sprayers equipped with jet or perforated pipe agitation. Return line agitation is not sufficient to keep this product in suspension. Fill the tank half full with water and begin agitation. Add half the required amount of Edge very slowly. Continue filling the tank with water gradually adding the remaining amount of Edge DF. Continue vigorous agitation at all times. Avoid adding Edge DF over the sump opening as filter plugging may occur.

**INCORPORATION:** Requires two incorporations at right angles for thorough mixing. The first incorporation must be done within 24 hours of spraying. The second incorporation may be performed at any time prior to seeding. See *Herbicide Information* section for additional details.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: May be mixed with liquid fertilizer. Conduct a compatibility test before mixing. May be impregnated onto dry bulk fertilizers. See *Herbicide Information* section for details on mixing and spreading.
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: No effect once incorporated.
- Grazing: Do not graze or harvest for forage in year of treatment.
- Recropping: Soil residues may affect subsequent crops. See *Table 24* for a list of susceptible crops.
- Storage: Store in a cool, dry place.

**ENVIRONMENTAL PRECAUTIONS:** Poor results can be expected if dry soil conditions prevail between application time and weed emergence.

## EPTAM 8-E (800 g/L)

**WEEDS CONTROLLED:** See *Table 29*.

**FORAGE LEGUMES:** Alfalfa or bird's-foot trefoil

**COVER CROPS:** Use only on alfalfa or bird's-foot trefoil sown without a cover crop.

**APPLICATION TIMING:**
a) Crop Stage: preplant incorporated
b) Weed Stage: preemergence

**RATES:** Apply 1.72 L/acre

**APPLICATION:** Ground spraying equipment mounted on an incorporation implement.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 200 kPa (30 psi)

**NOZZLES:** Flat fan

### Seedling Legumes

**INCORPORATION:** Eptam 8-E must be applied onto a dry soil surface and incorporated within minutes. See *Herbicide Information* section for further information on incorporation.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: May be applied with some liquid fertilizers and dry granular fertilizer. See the *Herbicide Information* section for specific instructions.
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: No effects once incorporated. Do not apply to a wet soil surface.
- Grazing: Do not graze or feed treated crops in year of treatment.
- Recropping: No recropping restrictions the year after treatment.
- Storage: May be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Crop injury can occur if the crop is under stress due to excessive cool conditions, wet soils, drought or excessive heat at the time of emergence.

**COMMENTS:** Eptam is extremely volatile. The first incorporation should be done in the same operation as spraying to reduce vapour losses.

## TREFLAN EC ([illegible] g/L), TREFLAN QR 5 ([illegible])

**Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Treflan will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**WEEDS CONTROLLED:** See *Table 29*.

**FORAGE LEGUMES:** Alfalfa, sweet clover (spring applications only for sweet clover)

**COVER CROPS:** May be used when forage legumes are sown alone or on alfalfa sown with canola or flax (use only fall applications with flax), or sweet clover sown with canola.

**APPLICATION TIMING:**
a) Crop Stage: preplant incorporated
b) Weed Stage: preemergence

**RATES:**

| PRODUCT | SOIL TYPE | |
|---|---|---|
| | Light soils with less than 6% organic matter | Medium to heavy soils with 6 - 15% organic matter |
| Fall Treflan QR 5 | 8.9 kg/acre | 11.3 - 13.8 kg/acre |
| Fall Treflan EC | not recommended* | not recommended* |
| Spring Treflan QR 5 | 6.9 kg/acre | 8.9 - 11.3 kg/acre |
| Spring Treflan EC | 0.61 L/acre | 0.81 - 1.1 L/acre |

*Although registered for fall application, the application and incorporation requirements predispose soils to erosion and this use is not recommended.

**APPLICATION:** Liquid – field sprayer
Granular – granular applicator

**WATER VOLUME:** 45 L/acre (liquid product only)

**PRESSURE:** 275 kPa (40 psi) (liquid product only)

**NOZZLES:** Flat fan (liquid product only)

**INCORPORATION:** Two incorporations required at right angles for thorough mixing. The first incorporation must be completed within 24 hours of spraying. When using the liquid, the second incorporation may be done immediately after the first. When using the granular delay the second incorporation for 3 days after the first. With fall applications the second incorporation may be delayed until the spring (unless a flax companion crop is used, in this case, both incorporations must be done in the fall). Refer to the *Herbicide Information* section for additional details.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: May be applied with liquid fertilizer (28-0-0) as a carrier. Conduct a compatibility test before mixing. See *Herbicide Information* section for details.
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: No effect once incorporated
- Grazing: Do not graze or harvest for livestock feed in the year of treatment.
- Recropping: Treflan leaves a residue in the soil which may affect subsequent crops. See *Table 24* for a list of susceptible crops.
- Storage: Do not freeze the liquid formulations. If stored below 5° C bring contents to 15° C for 24 hours and shake well before using. The granular product may be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Poor results will occur if dry conditions prevail at time of weed emergence. Injury to flax cover crops may occur if soil conditions are not conducive to rapid flax emergence. To minimize flax injury, cultivate shallowly in the spring and seed the crop into a moist, packed seedbed no more than 1.5 inches (4 cm) deep using a hoe drill or press drill. Do not seed when soil condition is cold (generally, seeding should commence no earlier than May 15).

**COMMENTS:** If fall applications are used, a shallow tillage in the spring prior to seeding is required to destroy existing weed growth and to warm the soil to activate the herbicide.

### Postemergence

## [illegible]

**WEEDS CONTROLLED:** Wild oats

### Seedling Legumes

**FORAGE LEGUMES:** Alfalfa, bird's-foot trefoil, red clover, sweet clover

**COVER CROPS:** Barley or wheat (Benito, Canuck, Chester, Columbus, Fielder, Glenlea, HY 320, Katepwa, Leader, Macoun, Neepawa or Selkirk only) must be sown with the forage.

**APPLICATION TIMING:**
a) Crop Stage: 1 to 6 leaf stage of cover crop
b) Weed Stage: 3 to 5 leaf

**RATES:** 1.01 to 1.21 L/acre. Use the higher rate if wild oat population is greater than 18 plants per square foot (200 per square meter).

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles directed 45° forward.

**TANK MIXES:**
- Herbicides: May be tank mixed with Cobutox or with 2,4-DB Butyric 400 in alfalfa, bird's-foot trefoil or red clover.
- Fertilizers: None
- Insecticides: None

Allow 4 days between application of Avenge and application of other herbicides.

**RESTRICTIONS:**
- Rainfall: Within 6 hours will reduce control.
- Grazing: Do not graze or cut crop for feed in year of treatment.
- Recropping: No restrictions the year following application.
- Storage: May be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Do not spray if crop is heavy with dew or rain. Do not apply if the crop is stressed from drought or excessive moisture. Do not spray if freezing temperatures are forecast.

**COMMENTS:** Avenge is most effective under warm, moist conditions. Performance will be poor under dry conditions. Crop injury may occur during hot, humid weather.

## BASAGRAN (480 g/L)

**WEEDS CONTROLLED:** See *Table 29*.

**FORAGE LEGUMES:** Alfalfa, red clover, alsike clover, and sainfoin. For seed production only.

**COVER CROPS:** May be used when forage legumes are sown alone or sown with a flax cover crop.

**APPLICATION TIMING:**
a) Crop Stage: No leaf stage restrictions on seedling legumes. Flax must be at least 2 inches (5 cm) tall.
b) Weed Stage: Apply when weeds are at the stages recommended in the chart.

**RATES:**

| Weeds | Rate of Basagran when weeds listed below are within the recommended treatment height | | | |
|---|---|---|---|---|
| | 0.71 L/acre | | 0.91 L/acre | |
| | inches | (cm) | inches | (cm) |
| **Annual Weeds** | | | | |
| Black nightshade | | | 0.2 - 0.7 | (0.5 - 1.8) |
| Cocklebur | 3 - 7 | (7.5 - 17.5) | 7 - 12 | (17.5 - 30.5) |
| Common chickweed | apply 1 to 3 weeks after chickweed emergence | | | |
| Common groundsel | | | 2 - 4 | ( 5.0 - 10.0) |
| Common ragweed | | | 1 - 2 | ( 2.5 - 5.0) |
| Corn spurry | | | 1 - 4 | ( 2.5 - 10.0) |
| Hairy galinsoga | | | 2 - 3 | ( 5.0 - 7.5) |
| Lady's thumb | 1 - 3 | (2.5 - 7.5) | 3 - 8 | ( 7.5 - 20.0) |
| Lamb's quarters | | | 0.5 - 1.0 | ( 1.3 - 2.5) |
| Purslane | | | 1 - 2 | ( 2.5 - 5.0) |
| Red root pigweed | | | 0.5 - 1.25 | ( 1.3 - 3.2) |
| Russian thistle | | | 1 - 3 | ( 2.5 - 7.5) |
| Venice mallow | 1 - 2 | (2.5 - 5.0) | 2 - 4 | ( 5.0 - 10.0) |
| Wild mustard | 1 - 5 | (2.5 - 12.5) | 5 - 10 | (12.5 - 25.0) |
| **Perennial Weeds** | | | | |
| Canada thistle | 6 - 8 | (15 - 20 ) | more than 8 | (more than 20) |
| Yellow nutsedge | 6 - 8 | (15 - 20 ) | more than 8 | (more than 20) |

**ADDITIVES:** Use 1 L to 2 L of Assist per 100 L of spray solution. Under hot humid conditions, use 1 L of Assist per 100 L of spray solution.

**WATER VOLUME:** 80 to 160 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles capable of delivering high water volumes.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 8 hours will reduce control.
- Grazing: Do not graze or harvest as forage.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Poor results will occur if temperatures are cool. Apply only if day time temperatures will exceed 21° C. Crop injury may occur under hot humid conditions. Only one application per season is recommended.

**COMMENTS:** Use at least 80 L/acre water to ensure thorough coverage with this contact herbicide. Top growth of thistles will be burnt off but rapid regrowth should be expected.

## CARBYNE 2 EC (240 g/L)

**WEEDS CONTROLLED:** Wild oats

**FORAGE LEGUMES:** Alfalfa, alsike clover, red clover, sweet clover

**COVER CROPS:** Wheat, barley, canola or flax may be sown as cover crops. Use of a competitive cover crop is strongly recommended since Carbyne will not give satisfactory results without crop competition.

### Seedling Legumes

**APPLICATION TIMING:**
a) Crop Stage: Cereals before the 4 leaf stage and no later than 14 days after emergence. Canola – no restrictions on crop stage. Flax – after the crop has developed true leaves. Seedling legumes – cotyledon to 4 trifoliolate leaf stage.
b) Weed Stage: 2 leaf stage and no later than 14 days following emergence.

**RATES:** 0.61 to 0.71 L/acre. Use the higher rate when wild oat density is 4 plants per square foot (40 plants per square meter) or more, when wild oats are not actively growing or when wild oats have been injured by frost or wind.

**WATER VOLUME:** 18 L/acre

**PRESSURE:** 300 kPa (45 psi)

**NOZZLES:** Teejet 650067, 730067, 800067
Delavan LF .67-65, LF .77-73, LF .67-80
Spray Jet 65.067, TK .75, D .75
Direct spray 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Carbyne and other herbicides.

**RESTRICTIONS:**
- Rainfall: Do not apply when crop is wet with dew or rain. Rainfall within 15 minutes will reduce control.
- Grazing: Do not graze or harvest for forage within 5 weeks of application.
- Recropping: No restrictions the year after application.
- Storage: May be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Performs best under cool, moist weather conditions. Under adverse growing conditions control will be severely reduced.

**COMMENTS:** Due to the very narrow application timing and the need for strong crop competition for satisfactory control, opportunities for successful use of Carbyne are limited. For heavy infestations or variable leaf stages of wild oats use of an alternative herbicide is recommended.

## *COBUTOX (400 g/L), EMBUTOX 625 (625 g/L), 2,4-DB BUTYRIC 400 (400 g/L)*

**WEEDS CONTROLLED:** See *Table 29.*

**FORAGE LEGUMES:** Alfalfa, bird's-foot trefoil, alsike clover or white Dutch clover

**COVER CROPS:** May be used on forage legumes sown alone or when sown with wheat, barley or oat cover crop.

**APPLICATION TIMING:**
a) Crop Stage: Cereals between the 5 leaf and shot blade stage. Forage legumes must be between the 1 and 3-trifoliolate leaf stage.
b) Weed Stage: 2 to 4 leaf stage.

**RATES:** Apply 1.21 to 1.42 L/acre of Cobutox or 2,4-DB Butyric 400 or 0.71 to 0.91 L/acre of Embutox 625. For narrow-leaved hawk's beard control, apply Cobutox or 2,4-DB Butyric at 1.42 L/acre or Embutox 625 at 0.91 L/acre in the fall, after legume growth ends.

**WATER VOLUME:** 60 to 80 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan

**TANK MIXES:**
- Herbicides: Cobutox or 2,4-DB Butyric 400 may be tank mixed with Avenge 280 C. To improve control of wild mustard beyond the 4 leaf stage, Cobutox at the reduced rate of 0.81 L/acre or Embutox 625 at 0.51 L/acre may be tank mixed with MCPA Sodium Salt (300 g/L) at 0.047 L/acre. This tank mix may increase crop damage. Follow all precautions and restrictions on both product labels.
- Fertilizers: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or feed treated crop in year of treatment.
- Recropping: No restrictions the year after application.
- Storage: May be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Severe damage to seedling legumes can occur if high temperatures or high humidity prevail at the time of application.

**COMMENTS:** Using less than 60 L/acre water volume will result in increased crop damage.

## *EMBUTOX 625 see COBUTOX*

## *FUSILADE (250 g/L)*

**WEEDS CONTROLLED:** See *Table 29.*

**FORAGE LEGUMES:** Alfalfa, bird's-foot trefoil, red clover

**COVER CROPS:** May be used when forage legumes are sown alone or when sown with a flax or canola cover crop.

### Seedling Legumes

**APPLICATION TIMING:**

a) Crop Stage: No leaf stage restrictions but do not apply within 80 days of harvest if a flax or canola cover crop is used.

b) Weed Stage: 2 to 4 leaf stage except 2 to 5 leaf stage of volunteer corn and 3 to 5 leaf stage of quackgrass. Do not apply after tillering of annual grass weeds.

**RATES:**

| WEED | LEAF STAGE | RATE (L/acre) |
|---|---|---|
| volunteer corn | 2 - 5 | 0.243 |
| barnyard grass, volunteer wheat, volunteer barley | 2 - 4 | 0.324 |
| wild oats, proso millet | 2 - 4 | 0.405 |
| green and yellow foxtail* | 2 - 4 | 0.57 |
| quackgrass suppression* | 3 - 5<br>but less than 8 in.<br>(20 cm tall) | 0.81 |

*Do not use these rates if a canola cover crop is used.

**ADDITIVES:** Add Agral 90 at a rate of 0.1 L per 100 L or spray solution.

**WATER VOLUME:** 45 to 130 L/acre. Use the higher water volume with heavy crop canopies or dense weed infestations.

**PRESSURE:** 200 to 275 kPa (30 to 40 psi)

**NOZZLES:** Flat fan

**TANK MIXES:**

- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 3 days between application of Fusilade and other herbicides. Fusilade must be applied first.

**RESTRICTIONS:**

- Preharvest: Do not apply within 80 days of harvest if flax or canola is used as a cover crop.
- Rainfall: Within 2 hours will reduce control.
- Grazing: Do not graze or harvest as forage.
- Recropping: Do not sow cereals, corn, or forage grasses within 60 days of application.
- Storage: May be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Reduced control will occur if grasses are under stress due to drought, flooding or excessively cool conditions.

**COMMENTS:** Experimental feeding studies have shown that the active ingredient in this product may cause birth defects in laboratory animals. Women capable of bearing children should avoid contact with this product. For quackgrass suppression ensure that rhizomes are thoroughly fragmented by spring tillage prior to seeding. Quackgrass plants more than 8 inches (20 cm) in height or which have reached the heading stage will not be controlled. Control will be reduced under hot or dry weather conditions.

## *HOE-GRASS 284 (284 g/L)*

**WEEDS CONTROLLED:** See *Table 29*.

**FORAGE LEGUMES:** Alfalfa, red clover, sweet clover, alsike clover (seed production only), sainfoin (seed production only)

**COVER CROPS:** May be used when forage legumes are sown alone or when sown with wheat, flax, canola or barley (except for varieties Betzes, Glenn, Klages and Norbert) cover crop.

**APPLICATION TIMING:**

a) Crop Stage: No leaf stage restriction on forage legumes but do not apply within 60 days of harvest for cover crop. If using a barley cover crop, do not apply after tillering.

b) Weed Stage: Wild oats, foxtail and barnyard grass 1 to 4 leaf stage and prior to tillering; Persian darnel 1 to 3 leaf stage; volunteer corn 6 to 10 inches (15 to 25 cm) in height. Although registered for application up to the 5 leaf stage of wild oats, results at this late leaf stage are inconsistent and this use is not recommended.

**RATES:** 1.01 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** 80° flat fan directed 45° forward

**TANK MIXES:**

- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days after application of Hoe-Grass 284 and application of other herbicides or fertilizers.

**RESTRICTIONS:**

- Preharvest: Do not apply within 60 days of harvest of cover crops.
- Rainfall: Within 1 hour of application will reduce control.
- Grazing: Do not graze or harvest as forage in the year of treatment. Do not graze Hoe-Grass treated alsike clover or sainfoin for the life of the stand.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Application under hot (above 27° C) or drought conditions will result in reduced weed control.

**COMMENTS:** Hoe-Grass provides optimum results under cool, moist conditions and should be applied when the majority of the grassy weeds are in the 2 to 3 leaf stage for best results.

## *MATAVEN L (52.5 g/L)*

**WEEDS CONTROLLED:** Wild oats.

### Seedling Legumes

**FORAGE LEGUMES:** Alfalfa, red clover, bird's-foot trefoil

**COVER CROPS:** May be used on forage legumes sown alone or when sown with a wheat cover crop. Use only on wheat varieties recommended for production in Manitoba (see 1990 Field Crop Variety Recommendations).

**APPLICATION TIMING:**
a) Crop Stage: No restrictions on seedling legumes. 1 to 6 leaf stage of wheat.
b) Weed Stage: 3 to 6 leaf stage.

**RATE:** 2.02 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 300 kPa (45 psi)

**NOZZLES:** Flat fan directed 45° forward. Use 50-mesh screens and filters.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Mataven L and MCPA.

Allow 7 days between application of Mataven L and application of other herbicides.

**RESTRICTIONS:**
- Rainfall: Within 2 hours of application will reduce control.
- Grazing: Do not graze or harvest for forage in the year of treatment.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**COMMENTS:** When wild oat infestations are heavy, treatment at the early stage (3 to 4 leaf) will maximize crop yields by reducing competition. Later treatments, when wild oats are more mature (4 to 6 leaf), will provide more complete control of late emerging wild oats. Wild oats at 2 leaf stage and younger will escape control and grow to maturity. Agitation will be required to re-emulsify spray if allowed to stand for several hours.

## *MCPA AMINE, MCPA SODIUM SALT AND SODIUM POTASSIUM SALT MIXTURES*

**Caution: Do not use on Flemish varieties of alfalfa. A list of Flemish varieties recommended for production in Manitoba is given in the 1990 Field Crops Variety Recommendations booklet.**

**WEEDS CONTROLLED:** See *Table 29.*

**FORAGE LEGUMES:** Alfalfa (except Flemish varieties), alsike clover, red clover, white Dutch clover

**COVER CROPS:** Wheat, barley, oats or flax must be used as cover crops.

**APPLICATION TIMING:**
a) Crop Stage: Apply when the majority of seedling legumes are in the 1 to 3 trifoliolate leaf stage. Cereals must be in the 2 leaf stage to shot blade stage. Flax must be between 2 inches (5 cm) tall and prebud stage.
b) Weed Stage: Weeds must be small, less than 2 inches (5 cm) tall or in diameter and actively growing.

**RATES:** Apply 0.49 to 0.52 L/acre of MCPA Sodium Salt (300 g/L) or 0.283 L/acre of formulations containing 500 g/L MCPA. For product volumes of other MCPA formulations, see *Table 21*.

**WATER VOLUME:** 70 to 90 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: MCPA amine – within 4 hours after application will reduce control. MCPA Sodium or Sodium Potassium mixtures – rainfall within 6 hours will reduce control.
- Grazing: Do not graze dairy cattle within 7 days following application.
- Recropping: None the year after treatment.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Severe crop injury can occur with this treatment. Injury will be most severe under hot, humid weather or under drought conditions.

**COMMENTS:** Greater crop injury may be expected when less than 70 L/acre of water is used. A good canopy formed by the cover crop and weeds will lessen the risk of injury to the seedling legume.

## *POAST (184 g/L)*

**WEEDS CONTROLLED:** See *Table 29.*

**FORAGE LEGUMES:** Alfalfa

**COVER CROPS:** May be used on alfalfa sown alone or sown with a flax or canola cover crop.

**APPLICATION TIMING:**
a) Crop Stage: No leaf stage restriction but do not apply within 70 days of harvest if canola is used as a cover crop. If flax is used as a cover crop, do not apply within 60 days of harvest.
b) Weed Stage: When the majority of the annual weeds are in the 2 to 5 leaf stage. Quackgrass is in the 1 to 3 leaf stage.

### Seedling Legumes

**RATES:**

| WEED | RATE (L/acre) WITH ASSIST | RATE (L/acre) WITH MERGE |
|---|---|---|
| green or yellow foxtail<br>barnyard grass, proso millet<br>witchgrass and volunteer corn | 0.324 - 0.405 | 0.324 - 0.405 |
| wild oats | 0.57 - 0.65 | 0.57 - 0.65 |
| volunteer wheat and oats | 0.65 | 0.57 - 0.65 |
| volunteer barley | 0.65 - 0.77 | 0.57 - 0.65 |
| quackgrass suppression | 1.78 | 1.1 |

Where a rate range is specified for a weed, use the higher rate to control heavy infestations.

**ADDITIVES:** Add Assist Oil Concentrate or Merge to all Poast treatments at 1 L per 100 L spray solution for annual weeds or at 1 to 2 L per 100 L spray solution for quackgrass.

**WATER VOLUME:** 25 to 80 L/acre. Use the higher water volumes if crop or weed growth is dense and when spraying quackgrass.

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Stainless steel 80° flat fan directed 45° forward.

**TANK MIXES:**

- Herbicides: None
- Fertilizer: See Poast Power Pack recommendation for information on mixes with ammonium sulphate.
- Insecticides: None

Allow 4 days between application of Poast and other herbicides.

**RESTRICTIONS:**

- Preharvest: Do not apply within 70 days of harvest if alfalfa is sown alone or with a rapeseed cover crop. Do not apply within 60 days of harvest if a flax cover crop is used.
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or harvest for forage prior to crop maturity.
- Recropping: A cultivation to a 4 inch (10 cm) depth is required 7 days prior to reseeding Poast-treated fields to grass crops such as corn, cereals or forage grasses in the year of treatment. Allow a minimum of 14 days between application of Poast and seeding of grass crops.
- Storage: May be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Control will be reduced if weeds are not actively growing due to drought, flooding or prolonged cool (15° C or cooler) periods. Do not apply if grassy weeds have been stressed for more than 20 days due to lack of moisture.

**COMMENTS:** For quackgrass suppression, rhizomes must be thoroughly fragmented prior to seeding. Quackgrass must be actively growing at the time of application for satisfactory results.

## *TROPOTOX PLUS (400 g/L)*

**WEEDS CONTROLLED:** See *Table 29*.

**FORAGE LEGUMES:** Red clover, alsike clover, white Dutch clover

**COVER CROPS:** May be used on these forage legumes sown alone or when sown with a barley, wheat or oats cover crop.

**APPLICATION TIMING:**

a) Crop Stage: Clover species must be in the 1 to 3-trifoliolate leaf stage.
b) Weed Stage: 2 to 4 leaf stage

**RATE:** 1.11 to 1.72 L/acre

**WATER VOLUME:** 60 to 80 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** flat fan

**TANK MIXES:**

- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: Within 4 hours will reduce control.
- Grazing: Do not graze or harvest as forage in year of treatment.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Applications under drought conditions will result in increased crop injury. Best activity on weeds occurs in warm weather. Under extremely hot or humid conditions, crop injury may be severe.

## *2,4-DB BUTYRIC see COBUTOX*

## Seedling Grasses

### Preplant or Preemergence (but post-emergence to weeds)

### *LAREDO (356 g/L), ROUNDUP (356 g/L), WRANGLER (356 g/L)*

**WEEDS CONTROLLED:** See *Table 29.*

**APPLICATION TIMING:**

a) Crop Stage: preplant or preemergence

b) Weed Stage: when annual weeds are cotyledon to 6 inches (15 cm) in height and quackgrass is 8 inches (20 cm) tall.

**RATES:** 0.91 to 1.42 L/acre. Use the higher rate if annual weeds are 6 inches (15 cm) tall. Use 1.01 L/acre for season long suppression of quackgrass.

**WATER VOLUMES:** Use clean water. Do not use 'hard' water. Use 45 to 120 L/acre. Use the higher water volumes if weed growth is dense. If more than 60 L/acre is used, the addition of 0.5 L of non-ionic surfactant (such as Agral 90, Ag Surf or Triton XR) per 100 L spray solution is recommended.

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan

**TANK MIXES:**

- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**

- Rainfall: Within 6 hours of application will result in reduced control.
- Grazing: Do not graze treated plants.
- Recropping: No effects on crops sown into these treatments.
- Storage: May be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Best performance occurs when weeds are actively growing, when temperatures are in the high 'teens' or low 'twenties' celsius and when weeds are not under drought stress.

### Postemergence

### *AVENGE 280 C (280 g/L)*

**WEEDS CONTROLLED:** Wild oats

**FORAGE GRASSES:** Creeping red fescue, meadow fescue, bromegrass, timothy, crested wheatgrass, orchardgrass, Russian wild ryegrass, reed canarygrass, Kentucky bluegrass

**COVER CROPS:** Barley or wheat (Benito, Canuck, Chester, Columbus, Fielder, Glenlea, HY 320, Katepwa, Leader, Macoun, Neepawa or Selkirk only) must be sown with the forage grass seedlings.

**APPLICATION TIMING:**

a) Crop Stage: 1 to 6 leaf stage of cover crop

b) Weed Stage: 3 to 5 leaf

**RATES:** 1.01 to 1.21 L/acre. Use the higher rate if wild oat population is greater than 18 plants per square foot (200 per square meter).

**WATER VOLUME:** 45 L/acre

**PRESSURES:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles directed 45° forward.

**TANK MIXES:**

- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Avenge 280 C and other herbicides.

**RESTRICTIONS:**

- Rainfall: Within 6 hours will reduce control.
- Grazing: Do not graze or cut crop for feed in year of treatment.
- Recropping: No restrictions the year following application.
- Storage: May be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Do not spray if crop is heavy with dew or rain. Do not apply if the crop is stressed from drought or excessive moisture. Do not spray if freezing temperatures are forecast.

**COMMENTS:** Avenge is most effective under warm moist conditions. Performance will be poor under dry conditions. Crop injury may occur during hot, humid weather.

### *BANVEL (480 g/L)*

**WEEDS CONTROLLED:** See *Table 29.*

**FORAGE GRASSES:** Creeping red fescue

**COVER CROPS:** May be used on creeping red fescue sown alone or with barley or wheat cover crop.

**APPLICATION TIMING:**

a) Crop Stage: Creeping red fescue – 2 inches (5 cm) tall or 3 leaf stage. Barley or wheat – 2 to 5 leaf stage (2 to 3 leaf stage for maximum crop tolerance)

b) Weed Stage: Weeds must be small (less than 2 inches (5 cm) in height or diameter) and actively growing.

### Seedling Grasses

**RATES:** Creeping red fescue sown alone – 0.236 L/acre. Creeping red fescue sown with barley – apply 0.093 L/acre Banvel plus 0.344 L/acre of 2,4-D amine. Creeping red fescue sown with wheat – 0.093 to 0.117 L/acre of Banvel plus 0.344 L/acre of 2,4-D amine.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan

**TANK MIXES:**
- Herbicides: 2,4-D amine
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 4 hours will reduce control.
- Grazing: Do not graze or harvest prior to crop maturity.
- Recropping: No restrictions the year after application.
- Storage: May be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Spray when air temperature is 10° to 25° C. Avoid application when crop is under stress from adverse environmental conditions. Do not spray if risk of frost or severe drop in night temperature is forecast.

**COMMENTS:** Late application will cause crop injury including head and stem deformities. Application under hot, dry conditions or at low water volumes can cause crop injury.

## *BASAGRAN (480 g/L)*

**WEEDS CONTROLLED:** See *Table 29*.

**FORAGE GRASSES:** Bromegrass, creeping red fescue, meadow foxtail, orchardgrass, timothy, crested wheatgrass. (Seed production only.)

**COVER CROPS:** Flax may be used as a cover crop.

**APPLICATION TIMING:**

a) Crop Stage: 1 to 7 leaf stage of forage grasses. Flax must be at least 2 inches (5 cm) tall.

b) Weed Stage: Apply when weeds are at the stages recommended in the chart.

**RATES:**

| Weeds | Rate of Basagran when weeds listed below are within the recommended treatment height | | | |
|---|---|---|---|---|
| | 0.71 L/acre | | 0.91 L/acre | |
| | inches | (cm) | inches | (cm) |
| **Annual Weeds** | | | | |
| Black nightshade | | | 0.2 - 0.7 | (0.5 - 1.8) |
| Cocklebur | 3 - 7 | (7.5 - 17.5) | 7 - 12 | (17.5 - 30.5) |
| Common chickweed | apply 1 to 3 weeks after chickweed emergence | | | |
| Common groundsel | | | 2 - 4 | ( 5.0 - 10.0) |
| Common ragweed | | | 1 - 2 | ( 2.5 - 5.0) |
| Corn spurry | | | 1 - 4 | ( 2.5 - 10.0) |
| Hairy galinsoga | | | 2 - 3 | ( 5.0 - 7.5) |
| Lady's thumb | 1 - 3 | ( 2.5 - 7.5) | 3 - 8 | ( 7.5 - 20.0) |
| Lamb's quarters | | | 0.5 - 1.0 | ( 1.3 - 2.5) |
| Purslane | | | 1 - 2 | ( 2.5 - 5.0) |
| Red root pigweed | | | 0.5 - 1.25 | ( 1.3 - 3.2) |
| Russian thistle | | | 1 - 3 | ( 2.5 - 7.5) |
| Venice mallow | 1 - 2 | ( 2.5 - 5.0) | 2 - 4 | ( 5.0 - 10.0) |
| Wild mustard | 1 - 5 | ( 2.5 - 12.5) | 5 - 10 | (12.5 - 25.0) |
| **Perennial Weeds** | | | | |
| Canada thistle | 6 - 8 | (15 - 20 ) | more than 8 | (more than 20) |
| Yellow nutsedge | 6 - 8 | (15 - 20 ) | more than 8 | (more than 20) |

**ADDITIVES:** Use 1 L to 2 L of Assist per 100 L of spray solution. Under hot humid conditions, use 1 L of Assist per 100 L of spray solution.

**WATER VOLUMES:** 80 to 160 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan nozzles capable of delivering high water volumes.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 8 hours will reduce control.
- Grazing: Do not graze or harvest as forage.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Poor results will occur if temperatures are cool. Apply only if day time temperatures will exceed 21° C. Crop injury may occur under hot humid conditions. Only one application per season is recommended.

**COMMENTS:** Use at least 80 L/acre water to ensure thorough coverage with this contact herbicide. Top growth of thistles will be burnt off but rapid regrowth should be expected.

## [illegible]

**WEEDS CONTROLLED:** See *Table 29*.

**FORAGE GRASSES:** Bromegrass, creeping red fescue, crested wheatgrass, intermediate wheatgrass, meadow fescue, orchard grass, reed canarygrass, Russian wild ryegrass, slender wheatgrass, tall wheatgrass, or timothy.

**COVER CROPS:** May be sown with wheat, barley, oats or flax cover crops.

**APPLICATION TIMING:**
a) Crop Stage: Forage grasses – 2 to 4 leaf stage. Barley, oats or wheat – 2 leaf to shot blade. Flax – 2 to 4 inches (5 to 10 cm).
b) Weed Stage: 2 to 4 leaf stage

**RATES:** Apply 0.405 L/acre

**WATER VOLUME:** 60 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or cut for feed in year of treatment.
- Recropping: No restrictions the year after application.
- Storage: Does not require heated storage.

**ENVIRONMENTAL PRECAUTIONS:** Avoid spraying during drought. Under conditions of high temperature and humidity, discoloration of cereals may occur.

**COMMENTS:** Because this is a contact herbicide poor results will occur if there is poor spray coverage. Weeds beyond the 4 leaf stage may outgrow the effects of the herbicide. Top growth of Canada thistle will be burnt off but there will be little effect on the root system, so rapid regrowth can be expected. Prolonged cool weather conditions may result in reduced weed control.

## *CARBYNE 2 EC (240 g/L)*

**WEEDS CONTROLLED:** Wild oats

**FORAGE GRASSES:** Bromegrass, creeping red fescue, crested wheatgrass, Russian wild ryegrass or timothy.

**COVER CROPS:** Wheat, barley, canola or flax may be sown as cover crops. Use of a competitive cover crop is strongly recommended, since Carbyne will not give satisfactory results without crop competiton.

**APPLICATION TIMING:**
a) Crop Stage: Cereals before the 4 leaf stage and no later than 14 days after emergence. Canola – no restrictions on crop stage. Flax – after the crop has developed true leaves but before the 12 leaf stage. Seedling grasses – 1 to 4 leaf stage.
b) Weed Stage: 2 leaf stage and no later than 14 days following emergence.

**RATES:** 0.61 to 0.71 L/acre. Use the higher rate when wild oat density is 4 plants per square foot (40 plants per square meter) or more, when wild oats are not actively growing, or when wild oats have been injured by frost or wind.

**WATER VOLUME:** 18 L/acre

**PRESSURE:** 300 kPa (45 psi)

**NOZZLES:** Teejet 650067, 730067, 800067
Delavan LF.67-65, LF.77-73, LF.67-80
Spray Jet 65.067, TK.75, D.75
Direct spray 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Carbyne and other herbicides.

**RESTRICTIONS:**
- Rainfall: Do not apply when crop is wet with dew or rain. Rainfall within 15 minutes will reduce control.
- Grazing: Do not graze or harvest for forage within 5 weeks of application.
- Recropping: No restrictions the year after application.
- Storage: May be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Performs best under cool, moist weather conditions. Under adverse growing conditions control will be severely reduced.

**COMMENTS:** Due to the very narrow application timing and the need for strong crop competition for satisfactory control, opportunities for successful use of Carbyne are limited. For heavy infestations or variable leaf stages of wild oats use of an alternative herbicide is recommended.

## *HOE-GRASS 284 (284 g/L)*

**WEEDS CONTROLLED:** See *Table 29*.

**FORAGE GRASSES:** Bromegrass, intermediate wheatgrass, Russian wild ryegrass, creeping red fescue, crested wheatgrass

**COVER CROPS:** Wheat, flax, canola or barley (except for varieties Betzes, Glenn, Klages and Norbert) may be used as cover crops.

### Seedling Grasses

**APPLICATION TIMING:**

a) Crop Stage: No leaf stage restriction on forage grasses but do not apply within 60 days of harvest of cover crops. If using barley cover crop, do not apply after tillering.

b) Weed Stage: Wild oats, foxtail and barnyard grass 1 to 4 leaf stage and prior to tillering; Persian darnel 1 to 3 leaf stage; volunteer corn 6 to 10 inches (15 to 25 cm) in height. Although registered for application up to the 5 leaf stage of wild oats, results at this late stage are inconsistent and this use is not recommended.

**RATE:** 1.01 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** 80° flat fan directed 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days after application of Hoe-Grass 284 and application of other herbicides or fertilizers.

**RESTRICTIONS:**
- Preharvest: Do not apply within 60 days of harvest of cover crop.
- Rainfall: Within 1 hour of application will reduce control.
- Grazing: Do not graze or harvest as forage in the year of treatment.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Application under hot (above 27° C) or drought conditions will result in reduced weed control.

**COMMENTS:** Hoe-Grass provides optimum results under cool, moist conditions and should be applied when the majority of the grassy weeds are in the 2 to 3 leaf stage for best results.

## *LONTREL (200 g/L)*

**WEEDS CONTROLLED:** See *Table 29*.

**FORAGE GRASSES:** Timothy (seed production only)

**COVER CROPS:** Canola may be used as a cover crop.

**APPLICATION TIMING:**

a) Crop Stage: Timothy must be in the 3 leaf stage. If using a canola cover crop, the canola must be in the 3 to 6 leaf stage.

b) Weed Stage: Annual weeds – 2 to 4 leaf stage. Canada thistle – majority of plants 4 inches (10 cm) tall.

**RATES:**

| RATE (L/acre) | RESULTS |
|---|---|
| 0.3 | Top growth suppression of Canada thistle. Expect regrowth by fall. Controls seedling alsike clover, suppresses established alsike clover. |
| 0.405 | Top growth control of Canada thistle. Expect regrowth next season. |
| 0.61 | Controls Canada thistle. Reductions in population may be evident next season. |
| 0.405 - 0.61 | Control of wild buckwheat, alsike clover and scentless chamomile. |

**WATER VOLUME:** 45 to 90 L/acre

**PRESSURE:** 200 to 275 kPa (30 to 40 psi)

**NOZZLES:** Flat fan

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 6 hours will reduce control.
- Grazing: Do not graze or harvest as forage.
- Recropping: Lontrel may affect succeeding crops. See *Table 24* for recropping information.
- Storage: Do not freeze.

**ENVIRONMENTAL PRECAUTIONS:** Poor control may occur if dry soil conditions prevail.

**COMMENTS:** Application to Canada thistle at the bud stage or later will result in poor control.

## *MATAVEN L (52.5 g/L)*

**WEEDS CONTROLLED:** See *Table 29*.

**FORAGE GRASSES:** Bromegrass, creeping red fescue, crested wheatgrass, intermediate wheatgrass, meadow fescue, Russian wild ryegrass

**COVER CROPS:** Wheat may be used as a cover crop. Use only on wheat varieties recommended for production in Manitoba. (see *1990 Field Crop Variety Recommendations.)*

**APPLICATION TIMING:**

a) Crop Stage: No restrictions on seedling grasses. 1 to 6 leaf stage of wheat.

b) Weed Stage: 3 to 6 leaf stage

**RATE:** 2.02 to 3.03 L/acre. Use the higher rate when grasses are grown without a cover crop and the lower rate when a wheat cover crop is used.

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 300 kPa (45 psi)

**NOZZLES:** Flat fan directed 45° forward. Use 50-mesh screens and filters.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

### Seedling Grasses

Allow 7 days between application of Mataven L and application of 2,4-D, Basagran, Tordon 202C or Banvel in crops and seedling forage crops where these products are registered. Allow 4 days between application of Mataven L and application of other herbicides.

**RESTRICTIONS:**
- Rainfall: Within 2 hours of application will reduce control.
- Grazing: Do not graze or harvest for forage in the year of treatment.
- Recropping: No restrictions the year after application.
- Storage: Do not freeze.

**COMMENTS:** When wild oat infestations are heavy, treatment at the early stage (3 to 4 leaf) will maximize crop yields by reducing competition. Later treatments, when wild oats are more mature (4 to 6 leaf), will provide more complete control of late emerging wild oats. Wild oats at 2 leaf stage and younger will escape control and grow to maturity. Agitation will be required to re-emulsify spray if allowed to stand for several hours.

## *PARDNER (280 g/L)*

**WEEDS CONTROLLED:** See *Table 29*.

**FORAGE GRASSES:** Bromegrass, crested wheatgrass, intermediate wheatgrass, slender wheatgrass, tall wheatgrass, meadow fescue, creeping red fescue, orchardgrass, reed canarygrass, Russian wild ryegrass and timothy.

**COVER CROPS:** Barley, wheat or oats may be used as a cover crop.

**APPLICATION TIMING:**
- a) Crop Stage: 3 to 4 leaf stage of seedling forage grasses. Cereals must be in the 2 leaf stage to early shot blade.
- b) Weed Stage: 2 to 4 leaf stage.

**RATES:** Apply 0.405 to 0.49 L/acre.

**WATER VOLUME:** 60 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan

**TANK MIXES:**
- Herbicides: May be tank mixed with 0.223 L/acre of 2,4-D amine if seedling grasses are sown alone or with a barley or wheat cover crop (Only some brands of 2,4-D are registered for use on these seedling grasses). Delay application until the 3 leaf stage of barley or wheat.
- Fertilizers: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 2 hours will reduce control.
- Grazing: Do not graze or cut treated crop for forage in year of treatment.
- Recropping: No restrictions the year after application.
- Storage: Does not require heated storage.

**COMMENTS:** These contact herbicides require thorough spray coverage for satisfactory results. Weeds beyond the 4 leaf stage will outgrow the effect of the herbicide. Under prolonged cool growing conditions control will be reduced.

## *POAST (184 g/L)*

**WEEDS CONTROLLED:** See rate table below.

**FORAGE GRASSES:** Creeping red fescue

**COVER CROP:** Flax or canola may be used as cover crops.

**APPLICATION TIMING:**
- a) Crop Stage: Creeping red fescue must be in the 2 to 4 leaf stage. No leaf stage restrictions on cover crops, but do not apply within 60 days of harvesting flax cover crops or 70 days of harvesting canola cover crops.
- b) Weed Stage: When the majority of annual weeds are in the 2 to 5 leaf stage. Quackgrass 1 to 3 leaf stage.

**RATES:**

| WEED | RATE (L/acre) |
|---|---|
| green or yellow foxtail<br>barnyard grass, proso millet,<br>witchgrass and volunteer corn | 0.324 - 0.405 |
| wild oats | 0.57 - 0.65 |
| volunteer wheat and oats | 0.65 |
| volunteer barley | 0.65 - 0.77 |
| quackgrass suppression | 1.78 |

Where a rate range is specified for a weed, use the higher rate to control heavy infestations.

**ADDITIVES:** Add Assist Oil Concentrate at 1 L/100 L spray solution for annual weeds or at 1 to 2 L/100 L spray solution for quackgrass. Do not use Merge.

**WATER VOLUMES:** 25 to 80 L/acre. Apply in at least 45 L/acre if crop or weed growth is dense and when spraying quackgrass.

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Stainless steel 80° flat fan directed 45° forward.

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

Allow 4 days between application of Poast and other herbicides.

**RESTRICTIONS:**
- Preharvest: Do not apply within 70 days of harvest

if a canola cover crop is used, 60 days if a flax cover crop is used.

- Rainfall: Within 1 hour will reduce control.
- Grazing: Do not graze or harvest as forage.
- Recropping: Do not seed cereals, corn or forage grass species within 14 days of application.
- Storage: May be stored at freezing temperatures.

**ENVIRONMENTAL PRECAUTIONS:** Control will be reduced if weeds are not actively growing due to drought, flooding or prolonged cool (15 °C or cooler) periods. Do not apply to grasses stressed for more than 20 days due to lack of moisture.

**COMMENTS:** For quackgrass suppression, rhizomes must be thoroughly fragmented prior to seeding.

## *TORDON 202 C (212 g/L)*

**WEEDS CONTROLLED:** See *Table 29*.

**FORAGE GRASSES:** Timothy, bromegrass

**COVER CROPS:** Wheat, barley

**APPLICATION TIMING:**
- a) Crop Stage: 4 leaf to shot blade stage. Do not apply after August 1 or yield losses, in the forage grasses, will occur the year after treatment.
- b) Weed Stage: 2 to 4 leaf stage.

**RATES:** 0.81 L/acre

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan

**TANK MIXES:**
- Herbicides: None
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 6 hours will reduce control.
- Grazing: Do not permit meat animals being finished for slaughter nor dairy animals to forage or graze treated fields within 2 weeks of treatment.
- Recropping: Do not plant fields treated with Tordon 202 C to alfalfa or sunflowers until at least the third growing season after the year of treatment, or beans, lentils, peas or potatoes until at least the fifth growing season after the year of treatment. If re-seeding becomes necessary fallow or replant to wheat, barley, oats, flax or rapeseed for two years following treatment. See *Table 24* for additional recropping information. Due to the length of recropping restrictions the use of Tordon 202 C in Manitoba is not recommended on farms where vegetable crops, pulse crops or forage legumes are included in the crop rotation.
- Storage: Do not freeze.

**COMMENTS:** Straw from crops treated with Tordon 202 C will contain residues of the herbicides. Although this straw is not toxic to livestock it should not be used for composting or mulching on susceptible broadleaf crops. If straw is used for bedding or animal feed return the manure to fields to be planted to grain crops, flax, rapeseed, or perennial grasses.

Soil from Tordon 202 C treated fields should not be moved to other areas, nor used to grow susceptible broadleaf plants unless an adequate, sensitive bioassay shows that no detectable picloram is present.

## *2,4-D AMINE*

**Caution: Only some brands of 2,4-D amine are registered for use on seedling forage grasses. Check the product label to ensure that the forage seedling grasses listed appear on the label.**

**WEEDS CONTROLLED:** See *Table 29*.

**FORAGE GRASSES:** Bromegrass, creeping red fescue, crested wheatgrass, intermediate wheatgrass, Kentucky bluegrass, meadow fescue, orchardgrass, reed canarygrass, Russian wild ryegrass, slender wheatgrass, tall wheatgrass, timothy, tame millet (except Setaria species such as Siberian millet)

**COVER CROPS:** Barley or wheat may be used as cover crops.

**APPLICATION TIMING:**
- a) Crop Stage: Seedling forage grasses — 4 leaf to shot blade. Barley or wheat — 4 leaf stage to shot blade.
- b) Weed Stage: 2 to 4 leaf

**RATES:** Use 0.34 to 0.445 L/acre (500 g/L formulations).

**WATER VOLUME:** 45 L/acre

**PRESSURE:** 275 kPa (40 psi)

**NOZZLES:** Flat fan

**TANK MIXES:**
- Herbicides: 0.223 L/acre may be tank mixed with Pardner.
- Fertilizer: None
- Insecticides: None

**RESTRICTIONS:**
- Rainfall: Within 4 hours after application will reduce control.
- Grazing: Do not graze for 24 hours after application.
- Recropping: No restrictions the year after treatment.
- Storage: Must be kept in heated storage.

**ENVIRONMENTAL PRECAUTIONS:** Less than acceptable results may be obtained when temperatures are cool or when dry conditions prevail. Results will be poorest when lower rates within the recommended range are used.

# Established Forage Crops

## Established Alfalfa

### Preemergence

***Kerb 50-W (50%)*** Controls foxtail barley. Apply 0.364 to 0.445 kg/acre product in 80 L/acre water between October 1 and freeze-up. Use only 50 mesh screens. Use the lower rate on grey wooded soils. Do not use on soils with more than 6 per cent organic matter. Reductions of 10 to 15 per cent in desirable grass species such as Kentucky bluegrass and meadow fescue will occur in legume/grass pasture mixes. Avoid reseeding into soil which has been treated with Kerb until the end of the following June. Do not harvest or graze within 60 days of treatment.

***Princep Nine-T (90%), Simazine 80 W (80%)*** Controls barnyard grass, green and yellow foxtail and several broadleaf weeds. See *Table 29*. Apply 0.445 kg/acre of Princep Nine-T or 0.61 kg/acre of Simazine 80 W in 120 L/acre water in fall (after legume growth has ceased but before freeze-up). Use only 50 mesh screens. This treatment will control susceptible plants as they germinate the following spring. Do not apply to alfalfa in the seedling year. Do not overlap or treat the same field with Princep Nine-T for three consecutive years.

***Sinbar (80%)*** Controls annual grasses and several broadleaf weeds. See *Table 29*. Apply 0.283 to 0.61 kg/acre product in 80 L/acre water after alfalfa goes dormant in fall or before new growth begins in spring. Fall application is preferable. Use the lower rate on light textured soils. Do not plant treated areas to any crop within two years as injury may result. Do not apply to alfalfa in the seedling year.

### Postemergence

***Fusilade (250 g/L)*** Controls wild oats, green and yellow foxtail, volunteer cereals and suppresses quackgrass. See *Table 29*. Apply the rate appropriate for the weeds to be controlled according to the following table.

| WEED | LEAF STAGE | RATE (L/acre) |
|---|---|---|
| volunteer corn | 2 - 5 | 0.243 |
| barnyard grass, volunteer wheat, volunteer barley | 2 - 4 | 0.324 |
| wild oats, proso millet | 2 - 4 | 0.406 |
| green and yellow foxtail | 2 - 4 | 0.57 |
| quackgrass suppression | 3 - 5 | 0.81 |

Apply at the recommended leaf stage in 45 to 120 L/acre of water using flat fan nozzles and a pressure of 30 to 40 psi (200 to 275 kPa). Add Agral 90 at a rate of 0.1 L/100 L of spray solution. Do not apply after tillering of annual grass weeds. Quackgrass plants more than 8 inches (20 cm) in height or which have reached the heading stage will not be controlled. Fusilade effectiveness will be reduced when plants are stressed by lack of moisture, excess moisture, flooding, low temperatures or very low relative humidity. Do not apply if rainfall is expected within 2 hours of application. Do not tank mix with other herbicides or fertilizers. Other herbicides must be applied at least 3 days after Fusilade. Do not reseed sensitive crops within 60 days of application. Avoid drift onto sensitive crops (corn, cereals, forage grasses and turf). Do not graze or feed treated crops during the year of treatment. Do not apply by air.

Experimental feeding studies have demonstrated that the active ingredient in this product can produce birth defects and other adverse effects in the developing fetus of rats. Women capable of bearing children should be particularly careful when handling this product. Occupational exposure to this product will be reduced by strict adherence to the handling precautions and use directions provided on the product label.

***Poast (184 g/L)*** Controls several annual grassy weeds and suppresses quackgrass. (See *Table 29* for spectrum of weeds controlled.)

Apply:

| WEED | RATE (L/acre) With Assist | RATE (L/acre) With Merge |
|---|---|---|
| green or yellow foxtail, barnyard grass, proso millet, witchgrass & volunteer corn | 0.324 - 0.406 | 0.324 - 0.406 |
| wild oats | 0.57 - 0.65 | 0.57 - 0.65 |
| volunteer wheat and oats | 0.65 | 0.57 - 0.65 |
| volunteer barley | 0.65 - 0.77 | 0.57 - 0.65 |
| quackgrass suppression | 1.78 | 1.1 |

Where a rate range is specified for a weed, use the higher rate to control heavy infestations. Apply Poast with Assist or Merge at 1 L per 100 L spray solution in 25 to 45 L/acre water. Apply with stainless steel 80° flat fan nozzles and use 40 to 45 psi (275 to 300 kPa) pressure. If weed infestations or crop canopy is dense, use 45 to 80 L/acre of water and 45 psi (300 kPa) pressure. Apply when the majority of annual grassy weeds are in the 2 to 5 leaf stage. Control may be reduced if grasses are not actively growing due to drought, flooding or prolonged cool periods (15° C or less). Do not use flood jet or hollow cone nozzles. Apply no later than 70 days prior to harvest. Do not graze or feed treated forage to livestock prior to crop maturity. Allow 4 days between application of Poast and any other chemicals. Apply Poast at the 1 to 3 leaf stage of the quackgrass in 45 to 80 L/acre water with Assist Oil Concentrate or Merge at 2 L per 100 L spray solution. Poor results will occur if the quackgrass is not actively growing at the time of treatment. Do not seed cereals, forage grasses, corn or other sensitive crops into Poast treated fields for at least 14 days following Poast application.

***2,4-D*** Controls several broadleaf weeds. See *Table 29*. Apply 0.57 L/acre of formulations containing 500 g/L 2,4-D immediately after harvest. This treatment may cause crop injury and should be used as a spot treatment only. For product volumes of other 2,4-D formulations, see Table 21.

# Established Bird's-foot Trefoil

## Preemergence

***Kerb 50-W (50%)*** Controls foxtail barley. Apply 0.364 to 0.445 kg/acre product in 80 L/acre water between October 1 and freeze-up. Use only 50 mesh screens. Use the lower rate on grey wooded soils. Do not use on soils with more than 6 per cent organic matter. Reductions of 10 to 15 per cent in desirable grass species such as Kentucky bluegrass and meadow fescue will occur in legume/grass pasture mixes. Avoid reseeding into soil which has been treated with Kerb until the end of the following June. Do not harvest or graze within 60 days of treatment.

***Princep Nine-T (90%), Simazine 80 W (80%)*** Controls barnyard grass, green and yellow foxtail and several broadleaf weeds. See *Table 29*. Apply 0.445 kg/acre of Princep Nine-T or 0.61 kg/acre of Simazine 80 W in 120 L/acre water in fall (September to November, prior to freeze-up). Use only 50 mesh nozzle screens. It may also be used in the seedling year if the stand is well established; at least 5 plants per square foot and 6 inches tall (at least 50 plants/square metre and 15 cm tall).

Do not overlap or treat the same field with Princep Nine-T or Simazine 80 W for three consecutive years.

## Postemergence

***Fusilade (250 g/L)*** Controls wild oats, green and yellow foxtail, volunteer cereals and suppresses quackgrass. See *Table 29*. Apply the rate appropriate for the weeds to be controlled according to the following table.

| WEED | LEAF STAGE | RATE (L/acre) |
|---|---|---|
| volunteer corn | 2 - 5 | 0.243 |
| barnyard grass, volunteer wheat, volunteer barley | 2 - 4 | 0.324 |
| wild oats, proso millet | 2 - 4 | 0.405 |
| green and yellow foxtail | 2 - 4 | 0.57 |
| quackgrass suppression | 3 - 5 | 0.81 |

Apply at the recommended leaf stage in 45 to 120 L/acre of water using flat fan nozzles and a pressure of 30 to 40 psi (200 to 275 kPa). Add Agral 90 at a rate of 0.1 L/100 L of spray solution. Do not apply after tillering of annual grass weeds. Quackgrass plants more than 8 inches (20 cm) in height or which have reached the heading stage will not be controlled. Fusilade effectiveness will be reduced when plants are stressed by lack of moisture, excess moisture, flooding, low temperatures or very low relative humidity. Do not apply if rainfall is expected within 2 hours of application. Do not tank mix with other herbicides or fertilizers. Other herbicides must be applied at least 3 days after Fusilade. Do not reseed sensitive crops within 60 days of application. Avoid drift onto sensitive crops (corn, cereals, forage grasses and turf). Do not graze or feed treated crops during the year of treatment. Do not apply by air.

Experimental feeding studies have demonstrated that the active ingredient in this product can produce birth defects and other adverse effects in the developing fetus of rats. Women capable of bearing children should be particularly careful when handling this product. Occupational exposure to this product will be reduced by strict adherence to the handling precautions and use directions provided on the product label.

# Established Clover

## (Alsike, Red and Sweet)

*There are no herbicides currently registered in Canada for use in established alsike or sweet clover.*

## Postemergence (red clover only)

***Fusilade (250 g/L)*** Controls wild oats, green and yellow foxtail, volunteer cereals and suppresses quackgrass. See *Table 29*. Apply the rate appropriate for the weeds to be controlled according to the following table.

| WEED | LEAF STAGE | RATE (L/acre) |
|---|---|---|
| volunteer corn | 2 - 5 | 0.243 |
| barnyard grass, volunteer wheat, volunteer barley | 2 - 4 | 0.324 |
| wild oats, proso millet | 2 - 4 | 0.405 |
| green and yellow foxtail | 2 - 4 | 0.57 |
| quackgrass suppression | 3 - 5 | 0.81 |

Apply at the recommended leaf stage in 45 to 120 L/acre of water using flat fan nozzles and a pressure of 30 to 40 psi (200 to 275 kPa). Add Agral 90 at a rate of 0.1 L/100 L of spray solution. Do not apply after tillering of annual grass weeds. Quackgrass plants more than 8 inches (20 cm) in height or which have reached the heading stage will not be controlled. Fusilade effectiveness will be reduced when plants are stressed by lack of moisture, excess moisture, flooding, low temperatures or very low relative humidity. Do not apply if rainfall is expected within 2 hours of application. Do not tank mix with other herbicides or fertilizers. Other herbicides must be applied at least 3 days after Fusilade. Do not reseed sensitive crops within 60 days of application. Avoid drift onto sensitive crops (corn, cereals, forage grasses and turf). Do not graze or feed treated crops during the year of treatment. Do not apply by air.

Experimental feeding studies have demonstrated that the active ingredient in this product can produce birth defects and other adverse effects in the developing fetus of rats. Women capable of bearing children should be particularly careful when handling this product. Occupational exposure to this product will be reduced by strict adherence to the handling precautions and use directions provided on the product label.

# *Established Grasses*

## Postemergence

***Banvel (480 g/L)*** Apply to seed stands of creeping red fescue only. Controls several broadleaf weeds. See *Table 29*. Apply 0.243 L/acre in 45 L/acre water. May be tank mixed with 2,4-D amine. Apply up to the early shot blade stage. For dandelion control use Banvel plus 2,4-D amine in the fall when the weed is in the rosette stage.

***Poast (184 g/L)*** Although Poast is registered for use on established creeping red fescue, this use is not recommended in Manitoba. Poast can cause injury to creeping red fescue. Full evaluations of the effects of staging, surfactants and environment on the degree of injury are not currently available.

***Lontrel (200 g/L)*** Apply to seed stands of timothy. See rate table for weeds controlled. Apply 0.3 to 0.61 L/acre in 45 to 90 L/acre water volume. Use standard flat fan nozzles at 275 kPa (40 psi) pressure.

| RATE (L/acre) | RESULTS |
|---|---|
| 0.3 | Top growth suppression of Canada thistle. Expect regrowth by fall. Controls seedling alsike clover, suppresses established alsike clover. |
| 0.405 | Top growth control of Canada thistle. Expect regrowth next season. |
| 0.61 | Controls Canada thistle. Reductions in population may be evident next season. |
| 0.405 - 0.61 | Control of wild buckwheat, alsike clover and scentless chamomile. Suppression of ox-eye daisy. |

May be applied in the spring or in fall. For fall application after timothy has been harvested and when Canada thistle has at least 6 inches (15 cm) of new growth. For spring applications, apply early in spring when timothy is no more than 6 inches (15 cm) tall. Do not apply when timothy is in the boot stage. Weeds must be actively growing at the time of spraying.

Do not apply Lontrel more than once in a single growing season. Do not graze or harvest for forage in the season after fall applications or in the season of spring applications.

Spring applications will give better weed control than fall applications.

Lontrel leaves a residue which may affect subsequent crops. See *Table 24* for recropping recommendations.

***Tordon 202 C (212 g/L)*** Apply to seed stands of timothy or bromegrass. See *Table 29* for weeds controlled. Apply 0.81 L/acre in 45 to 90 L/acre water. Use standard flat fan nozzles at 275 kPa (40 psi) pressure. Spray in the spring when weeds are in the 2 to 4 leaf stage. Do not apply more than once per growing season. Do not harvest for forage or graze treated crop in the year of treatment. Tordon 202 C leaves a residue in the soil which affects crop rotation choices. See *Table 24* for recropping recommendations. Straw from crops treated with Tordon 202 C will contain residues of the herbicide. Do not use this straw for composting or mulching on susceptible broadleaf crops. Soil from Tordon 202 C treated fields should not be moved to other areas, nor used to grow susceptible broadleaf plants unless an adequate, sensitive bioassay shows that no detectable picloram is present.

# Pastures and Hayfields

## TABLE 17 SUMMARY OF PASTURE RECOMMENDATIONS

| PRODUCT | RATE (L/acre) | Absinthe | Bindweed, Field | Bladder Campion | Burdock | Canada Thistle | Cinquefoil | Dock, Curled | Daisy, English | Flixweed | Foxtail Barley | Gumweed | Hawk's Beard, Narrow Leaved | Knapweed | Leafy Spurge | Nodding Thistle | Poplar | Pussy-Toes | Red Bartsia | Sage, Pasture | Sow Thistle | Snowberry | Stinkweed | Tansy | Willow | Yarrow |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Banvel | 0.84 | | ☐ | | | ☐ | | ☐ | ☐ | ● | | | | | ☐ | | | | | | ☐ | | ●[a] | | | |
| Banvel | 1.86 | | ☐ | | | ☐ | | ☐ | ☐ | ● | | | | ☐ | ☐ | | | | | ☐ | ☐ | | ●[a] | | | |
| Banvel + 2,4-D | 0.84 + 0.89 | | ☐ | | | ☐ | | ☐ | ☐ | ● | | | | | ☐ | | | | | | ☐ | | ●[a] | | | |
| Banvel + 2,4-D | 0.84 + 1.62 | ☐ | ☐ | | | ☐ | | ☐ | ☐ | ● | | | | | ☐ | | ☐[b] | | | | ☐ | ☐[b] | ●[a] | | ☐[b] | |
| Cobutox/2,4-D B Butyric | 1.11 - 1.42 | | ☐ | | | ☐ | | ■ | | | | | ■[a] | | | | | | | | ☐ | | | | | |
| Embutox 625 | 0.71 - 0.91 | | ☐ | | | ☐ | | ■ | | | | | ■[a] | | | | | | | | ☐ | | | | | |
| Kerb | 0.364 - 0.445 | | | | | | | | | | ● | | | | | | | | | | | | | | | |
| 2,4-D (500 g/L) | 0.57 - 0.81 | | | | ● | | | | | ● | | ☐ | | | | | | | ● | | | | ●[a] | | | |
| 2,4-D (500 g/L) | 0.91 | | ☐ | | ● | ☐ | | ☐ | | ● | | ☐ | | | | ☐ | | | ● | | ☐ | | ●[a] | | | |
| 2,4-D (500 g/L) | 1.82 | ☐[b] | ☐ | | ● | ☐ | | ● | | ● | | ☐ | | | ☐ | ☐ | ☐[b] | ☐ | ● | | ☐ | ☐[b] | ●[a] | | ☐[b] | |

**LEGEND**

- ● Controlled.
- ■ Controlled by the highest rate within this range.
- ☐ Top growth suppression.
- [a] Seedlings only, overwintered rosettes will not be controlled.
- [b] Use 2,4-D LV ester for brush species.

Certain poisonous plants become more palatable to livestock after being sprayed with herbicides. As a result, poisonous plants which normally would be unpalatable, could be eaten following spraying. Information on common poisonous weeds is given at the end of the *Special Weed Problems* section. In areas not suited to boom equipped ground sprayers, consider ground sprayers equipped with a cluster nozzle or aerial applications if registered.

Adequate spray volumes (at least 45 L/acre for ground applications unless otherwise stated) are required to minimize drift and to ensure adequate spray coverage. For additional information on brush control see *Brush Control* section.

***Banvel (480 g/L)*** Apply appropriate rate from Table below in 45 to 90 L/acre water to grass pastures when weeds are actively growing. Repeat applications may be necessary. Do not apply to stands containing legumes.

| Species | Rate (L/acre) | |
|---|---|---|
| | Banvel | 2,4-D |
| Top growth suppression of Canada thistle, field bindweed, English daisy, curled dock, perennial sow thistle and leafy spurge | 0.84 | – |
| Above weeds plus top-growth suppression of diffuse knapweed, poverty weed, goat's beard, pasture sage, thyme leaved spurge | 1.86 | – |
| Top growth suppression of Canada thistle, field bindweed, English daisy, curled dock, perennial sow thistle plus annual species susceptible to 2,4-D | 0.84 + | 0.89 |
| Above species plus western snowberry (buckbrush), wolf willow (silver willow), wild rose, aspen poplar | 0.84 + | 1.62 |

Use higher water volumes (120 L/acre) and ester formulations when treating brush species. Apply brush control treatments when leaves have fully expanded (in spring or early summer).

Do not graze dairy cattle for 7 days after treatment with the 0.84 L/acre rate of Banvel or 14 days following the 1.86 L/acre rate. If treated pastures or hay has been consumed by meat animals within 30 days of Banvel application, feed the animals with untreated forage for 30 days before slaughter. Meat animals may graze treated pasture 30 days after Banvel application without restrictions on slaughter.

***Cobutox (400 g/L), Embutox 625 (625 g/L), 2,4-DB Butyric 400 (400 g/L)*** Controls several broadleaf weeds. See *Forage Crops Chart.* May be applied to grass or mixed grass/alfalfa pastures. Apply Cobutox or 2,4-DB Butyric 400 at 1.11 to 1.42 L/acre or Embutox 625 at 0.71 to 0.91 L/acre in 60 to 80 L/acre water. Apply before pasture has 3 inches (7.5 cm) of new growth, in the spring or after cutting or grazing. Some height reduction may occur. Treatment will be less effective when applied during cool weather conditions.

To control narrow-leaved hawk's beard seedlings, apply Cobutox or 2,4-DB Butyric 400 at 1.42 L/acre or Embutox 625 at 0.91 L/acre in 60 to 80 L/acre water. Use in the fall after legume growth ceases.

***Kerb 50-W (50%)*** Controls foxtail barley. May be applied to grass or mixed grass/alfalfa pastures. Apply 0.364 to 0.445 kg/acre product in 80 L/acre water between October 1 and freeze-up. Use 50 mesh screens. Use the lower rate on grey-wooded soils. Do not apply to grasses for seed production or to desired stands of timothy or fescue grass species. Reductions of 10 to 15 per cent in desirable grass species such as Kentucky bluegrass will occur in legume/grass pasture mixes. Avoid reseeding into soil which has been treated with Kerb until the end of the following June. Do not harvest or graze within 60 days of treatment. Do not use on soils with more than six per cent organic matter.

***Tordon 22K (240 g/L)*** *Do not apply Tordon 22K if the stand contains legumes.* Controls perennial thistles and leafy spurge. To control perennial thistles apply at 1.82 L/acre in 160 L/acre water from the rosette stage in the spring through flowering but before the first heavy frost in the fall. To control leafy spurge apply at 3.64 L/acre in 160 L/acre water before the plants set seed.

**NOTE:** *Tordon 22K is registered for the control of biennial and deep-rooted perennial broadleaf weeds on rangeland and permanent grass pastures when* ***applied under the direction of an authorized applicator.*** *Directions for use and precautions must be followed carefully.*

***2,4-D*** Apply to grass pastures when weeds are actively growing. Do not apply to stands containing legumes. Repeat applications are required, with one application in mid- to late June when weeds are actively growing and a second application in fall when regrowth has appeared. Apply in 45 L/acre water. Apply formulations containing 500 g/L at the following rates.

| Species | Rate (L/acre) |
|---|---|
| common burdock, flixweed, gumweed, red bartsia, stinkweed, goat's beard, ragweeds | 0.57 to 0.81 |
| gumweed, cocklebur, goat's beard, common burdock, top growth suppression of Canada thistle | 0.91 |
| absinthe, pasture sage, biennial wormwood, prairie everlasting (pussy-toes) and leafy spurge | 1.82 |
| western snowberry (buckbrush), willows, wolf willow and scrub poplar | 1.82 to 3.64 |

To control brush species apply in at least 80 L/acre water in July when leaves have fully expanded. For brush control 2,4-D LV ester may be applied by air in 12 to 23 L/acre oil in June or early July.

For product volumes of other 2,4-D formulations *see Table 21*. Retreatment may be required the following year.

***2,4-DB Butyric 400 see Cobutox.***

### Pasture Renovation

Certain products can be used to control or suppress existing vegetation for minimum tillage seeding of forages into established sod for renovating pastures.

***Gramoxone (200 g/L)*** Controls annual broadleaf and grassy weeds. Apply 1.11 to 2.23 L/acre in 120 to 200 L/acre water in May after 2 to 4 inches (5 to 10 cm) of new growth has appeared. To control perennial broadleaf weeds apply 2,4-D or a 2,4-D based treatment in August prior to Gramoxone treatment.

***Laredo (356 g/L), Roundup (356 g/L), Wrangler (356 g/L)*** Controls annual broadleaf and grassy weeds. Apply 0.91 to 1.42 L/acre in 45 to 120 L/acre water. When using more than 65 L/acre water volume, add 0.5 L per 100 L spray solution of non-ionic surfactant such as Agral 90, Ag Surf or Triton XR. Use on existing vegetation immediately before, during or after zero-till seeding of forages into the established sod. For best results apply when plants are actively growing or well established so sufficient movement of the chemical will occur into the root system to give effective control. Spray coverage should be uniform and complete. Do not spray to run-off.

Heavy rainfall within 2 hours after application may wash the chemical off the foliage and a repeat treatment may be required. Rainfall occurring within 6 hours after application may reduce effectiveness. For control of perennial weed problems see the section on *Special Weed Problems.*

# Horticulture Crops

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## TABLE 18 HERBICIDES FOR HORTICULTURE CROPS

| CROPS<br>HERBICIDES | Asparagus | Beans, Lima | Beans, Snap | Beets | Broccoli, Brussel Sprouts | Cabbage, Cauliflower | Carrots | Celery | Corn, Sweet | Cucumbers | Onions | Parsnips | Peppers | Potatoes | Rutabagas | Tomatoes | Raspberries | Strawberries | Barnyard Grass | Foxtail, Green | Foxtail, Yellow | Wild Oats | Quack Grass | Bindweed, Field | Blue Bur | Buckwheat, Tartary | Buckwheat, Wild | Catchfly, Night Flowering | Chickweed | Cockle, Cow | Cocklebur |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Afolan F/Linuron 400 L/Lorox L | X | | | | | | X | X[1] | | | | X[11] | | | | | | | ● | S | S | | | | | | ● | | ● | | |
| Agricultural Weedkiller No. 1 | | | | | | | X | | | | | X | | | | | | | ● | ● | ● | ● | | | | | | | | | |
| Alanap 3 | | | | | | | | | | X | | | | | | | | | | ● | ● | | | ● | | | | | ● | | ● |
| Basagran | | X | X | | | | | | X | | | | | | | | | | | | | | | ● | | | | | ● | | ● |
| Buctril M | | | | | | | | | X | | | | | | | | | | | | | | | | ● | ● | ● | ● | | ● | ● |
| Casoron 4G | | | | | | | | | | | | | | | | | X | | | ● | ● | | | | | | | | ● | | |
| Dacthal W-75 | | | | | | | | | | | | | | | | | | X | | ● | ● | | | | | | | | ● | | |
| Devrinol 50 W-P[8] | | | | | | | | | | | | | | | | X | X | X | ● | ● | ● | ● | | | | | | | ● | | |
| Dual | | | | | | | | | X | | | | | X | | | | | ● | ● | ● | | | | | | | | | | |
| Dyanap | | | | | | | | | | X | | | | | | | | | ● | ● | ● | | | | | | | | | | |
| Enide | | | | | | | | | | | | | | | | | | X | ● | ● | ● | | | | | | | | | | |
| Eptam | | | X | | | | | | | | | | | X | X | | | | ● | ● | ● | ● | S | | | | | | ● | | |
| Eptam + Sencor or Lexone | | | | | | | | | | | | | | X | | | | | ● | ● | ● | ● | S | | | | | | ● | | |
| Eradicane 8-E | | | | | | | | | X | | | | | | | | | | ● | ● | ● | ● | S | | | | | | ● | | |
| Excel | | | | | X[7] | X | | | | | X | | | X | | | | | ● | ● | ● | ● | | | | | | | | | |
| Fusilade | | | | | | | | | | | X | | | X | | X | | X | ● | ● | ● | ● | S | | | | | | | | |
| Goal[4] | | | | | | | | | | | X[4] | | | | | | | | | | | | | | | | ● | | | | |
| Gramoxone-stale seedbed | | X | X | X | X | X | X | | X | X | X | | | X | X | | | | CONTROLS | | | | | | | | | | | | |
| Gramoxone-pre to crop | X | | | | | | | | | | | | | X | | | X[3] | | CONTROLS | | | | | | | | | | | | |
| Gramoxone-pre to crop + Lexone DF | | | | | | | | | | | | | | X | | | | | CONTROLS | | | | | | | | | | | | |
| Hoe-Grass 284 | | | X | | | | X | | | | X[4] | | | X | | | | | ● | ● | ● | ● | | | | | | | | | |
| Karmex | X | | | | | | | | | | | | | | | | | | | ● | | | | | | | | | | | |
| Kil-Mor | | | | | | | | | X | | | | | | | | | | | | | | | □ | □ | ● | ● | □ | | ● | ● |
| Laredo/Roundup/Wrangler-pre to crop | | | | | | | | | | | | | | X | | | | | CONTROLS | | | | | | | | | | | | |
| Lontrel | | | | | | | | | | | | | | | | | | X | | | | | | | | | | | | | |
| Pardner | | | | | | | | | X | | | | | | | | | | | | | | | | | ● | ● | ● | | ● | |
| Poast | | X | X | | | | | | | X | X | | | X | | X | | | ● | ● | ● | ● | S | | | | | | | | |
| Prefar | | | | | | | | | | X | | | | | | | | | ● | ● | ● | | | | | | | | | | |
| Primextra[5] | | | | | | | | | X | | | | | | | | | | ● | ● | ● | | | | | | ● | | | | |
| Princep Nine-T/Simazine 80W/ Simadex 80W | X | | | | | | | | | | | | | | | | X | | ● | | ● | ● | | | | | ● | | | | |
| Rival/Treflan EC[12] | X | X | X | | X | X | X | | | | | | X | | X | X | | X | ● | ●[13] | ●[13] | ● | | | | | ● | | ● | ● | |
| Ro-Neet 7.2 E | | | | X | | | | | | | | | | | | | | | ● | ● | ● | ● | | | | | | | | | |
| Sencor, Lexone | X[9] | | | | | | | | | | | | | X | | | | | | | | | | | | ● | | | ● | | |
| Sinbar | | | | | | | | | | | | | | | | | | X | ● | ● | ● | | | | | | | | ● | | |
| Sutan + | | | | | | | | | X | | | | | | | | | | ● | ● | ● | | | | | | | | | | |
| TCA | | | | X | | | | | | | | | | | | | | | | ● | ● | | | | | | | | | | |
| Tenoran | | | | | | | | | | | | | | | | | | X | | | | | | | | | | | ● | | ● |
| 2,4-D | X | | | | | | | | X | | | | | | | | X | | | | | | | □ | ● | | | | | | ● |

| WEEDS |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flixweed | Goosefoot, Oak-leaved | Groundsel | Hemp Nettle | Knotweed, Prostrate | Kochia | Lamb's-quarters | Lettuce, Prickly | Mustard, Ball | Mustard, Dog | Mustard, Hare's-ear | Mustard, Indian | Mustard, Tumble | Mustard, Wild | Mustard, Wormseed | Pigweed, Prostrate | Pigweed, Red Root | Pigweed, Russian | Pigweed, Tumble | Purslane | Ragweed, Common | Ragweed, False | Ragweed, Giant | Russian-Thistle | Shepherd's Purse | Annual Smartweed Species, Lady's Thumb | Sow Thistle (Annual) | Sow Thistle (Perennial) | Stinkweed | Thistle, Canada | Volunteer Cereals (Wheat, Barley) | Volunteer Corn | Volunteer Rapeseed |
|  | ● |  |  | ● |  | ● |  |  |  |  |  |  |  | ● | ○ | ● |  |  | ● | ● | ● | ● |  | ● | ● | ● |  | ● |  |  |  |  |
|  |  |  |  |  |  | ● |  |  |  |  |  |  |  |  |  | ● |  |  | ● |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  | ● |  |  |  |  |  |  |  |  |  | ● |  |  | ● | ● | ● | ● |  |  |  |  |  |  |  |  |  |  |
|  |  | ● |  |  |  | ● |  |  |  |  |  |  | ● |  |  | ● |  |  | ● | ● |  | ● | ● |  | ● |  |  |  | □[a] |  |  |  |
| ● |  | ● |  |  | ● | ● |  | ● |  |  |  |  | ● | ● | ○ | ● |  |  |  | S |  |  | ● | ● | ● | ○ | □[b] | ● | □[b] |  |  | ● |
|  |  |  |  | ● |  | ● |  |  |  |  |  |  | ● |  |  | ● |  |  | ● |  |  |  |  | ● | ● |  |  |  |  |  |  |  |
|  |  |  |  |  |  | ● |  |  |  |  |  |  |  |  |  |  |  |  | ● |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | ● |  | ● |  | ● |  |  |  |  |  |  |  |  |  | ● |  |  | ● |  |  |  |  |  |  | ● |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  | ● |  | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | ● |  | ● |  |  |  |  |  |  |  |  | ● | ● | ● | ● |  |  |  |  |  |  | ● |  |  |  |  |  |  |  |
|  |  |  |  |  |  | ● |  |  |  |  |  |  |  |  | ● | ● |  | ● | ● |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  | ● |  |  | ● |  |  |  |  |  |  | ● |  | ● | ● |  | ● | ● |  |  |  |  |  | ● |  |  | ● |  |  |  | ●[c] |
|  |  |  |  |  |  | ● |  |  |  |  |  |  |  |  | ● | ● |  | ● | ● |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | ●[10] | ● |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | ● | ● |  |
|  | ● |  |  |  |  | ● |  |  |  |  |  |  |  |  |  | ● |  |  | ● |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ANNUAL WEED SEEDLINGS AND TOP GROWTH OF PERENNIAL WEEDS |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ANNUAL WEED SEEDLINGS AND TOP GROWTH OF PERENNIAL WEEDS |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ANNUAL WEED SEEDLINGS AND TOP GROWTH OF PERENNIAL WEEDS[6] |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| ANNUAL WEED SEEDLINGS AND TOP GROWTH OF PERENNIAL WEEDS |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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**LEGEND:**

**HERBICIDES AND CROPS**

X Recommended on crop.

[1] Afolan only.

[3] Apply as directed spray.

[4] Dry bulb onion only.

[5] These treatments may remain as a residue in the soil the following year. Flax, peas, triazine tolerant canola and fababeans are more tolerant crops. See comments in corn section for specific instructions.

[6] Does not control established weeds. To avoid injury to crops not specified on the label, do not plant until 12 months after the last Devrinol 50 W-P application.

[7] Broccoli only.

[8] Plus residual control of Lexone labelled weeds see product label.

[9] Sencor only.

[10] Barley only.

[11] Afolan or Linuron 400 L only.

[12] Spring Application only.

[13] Will not control trifluralin-resistant foxtail.

**LEGEND: WEEDS**

● Controlled by maximum rates recommended for crops. Where two brand names are recommended, the weed may not appear on both labels.

S Suppression.

○ Not labelled for control but adequate control can be expected.

□ Top growth control only.

‡ Controlled by rates less than the maximum recommended for crops.

[a] Split application required for adequate control.

[b] Regrowth can be expected.

[c] Except triazine tolerant canola.

# Vegetables

## Stale Seedbed

### *Crops*

Beans (all types), beets, brussel sprouts, carrots, cabbage, cauliflower, corn, cucumber, kale, onions, peas, potatoes, rutabagas.

### *Method*

Prepare seedbed 2 to 4 weeks before seeding to stimulate weed growth. Seed without further cultivation and with minimum disturbance of the soil. Emerged weeds must be burned off with Gramoxone either before or shortly after seeding, but no later than 3 days before the crop will emerge.

***Gramoxone (200 g/L)*** Controls annual grasses and broadleaf weeds and top growth of perennial weeds. Apply 1.12 to 2.22 L/acre in 120 to 445 L/acre clean water preemergent to the crop, postemergent to the weeds. Use the higher rate when weeds are above 2 inches (5 cm) in height, and the higher volume of water on dense weed growth.

# Asparagus

## Established stands only.
## Before spear emergence or after last cutting.

***Afolan F (480 g/L), Linuron 400 L (400 g/L), Lorox L (480 g/L)*** Controls barnyard grass, green and yellow foxtail and several broadleaf weeds (Table 18). Apply Afolan F at 1.42 to 1.9 L/acre in 90 to 135 L/acre water or Linuron 400 L at 1.72 to 2.23 L/acre in 80 to 160 L/acre water or Lorox L at 1.82 L/acre in 120 L/acre water. Treatment may be repeated after last cutting. Do not use on sandy or coarse textured soils low in organic matter (less than 3%). Do not replant to other crops within 4 months after application.

***Gramoxone (200 g/L)*** Controls annual grasses, broadleaf weeds and top growth of perennial weeds. Apply 1.11 to 2.22 L/acre in 120 to 445 L/acre clean water to emerged weeds. Use the higher rate when weeds are above 2 inches (5 cm) in height, and the higher volume of water on dense weed growth. Do not apply to emerged spears which are to be used for human consumption.

***Karmex (80%)*** Controls several grass and broadleaf weeds (Table 18). Apply as a band or broadcast treatment. On light sandy soils or other soils low in clay or organic matter apply Karmex at 0.44 to 0.91 kg/acre product in 100 to 160 L/acre water. On soils high in clay or organic matter, use 0.91 to 1.82 kg/acre product in 100 to 160 L/acre water.

Two applications may be used. The first application should be made before weeds become established, but no earlier than 4 weeks before spear emergence and no later than early cutting period (if weeds are controlled into the cutting period by cultural practices, application may be delayed until immediately after the last cultivation). A second application may be made immediately following completion of harvest provided rainfall is expected. When two applications are used in one season, do not exceed 1.31 kg/acre per application. If irrigation is used, apply only a single treatment of 1.82 kg/acre in late September or October.

Well established weeds should be eliminated by mechanical or other means. For best results, the soil should be well prepared and as free as possible from trash and clods. Sufficient moisture in the form of rainfall or irrigation is necessary after treatment to carry the chemical into the root zone of germinating weeds.

**Note:** Spray booms must be shut off while starting, turning, slowing, or stopping or crop injury will occur. The soil surface should not be cultivated or disturbed after application as weed control may be reduced and/or crop injury may result. **Do not replant treated areas to any crop within two years after last application as injury to subsequent crops may result.** Do not use on soils with less than one per cent organic matter content.

***Lorox L*** see Afolan F.

***Princep Nine-T (90%), Simadex 80 W (80%), Simazine 80 W (80%)*** Controls barnyard grass, wild oats and several broadleaf weeds (Table 18). Apply Princep Nine-T at 1.01 to 1.52 kg/acre or Simadex 80 W or Simazine 80 W at 1.11 to 1.72 kg/acre product in 120 L/acre water after discing in spring prior to weed and spear emergence and at least seven days before first cutting. A second application may be made after harvest if weeds are removed. Do not apply during cutting season.

**CAUTION:** Simadex 80 W, Simazine 80 W and Princep Nine-T are residual herbicides. Do not plant any crop in the treated area in the same year except corn. **Do not exceed recommended rate** or overlap as injury may result to succeeding crops. Extended periods of dry weather during the year of treatment will cause increased carryover which can cause injury to succeeding crops such as white beans, onions, peas, tomatoes and turnips.

***Rival (500 g/L), Treflan EC (545 g/L)*** Use only on asparagus that has been established 3 seasons or more. Controls green and yellow foxtail and several broadleaf weeds (*Table 18*). **Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Rival and Treflan will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for details.** Apply in the spring after ferns are removed but before spear emergence; or after harvest in the late spring or early summer before ferning begins.

| PRODUCT | SOIL TYPE | |
|---|---|---|
| | Light Soils with 2 - 6% organic matter | Medium to Heavy Soils 6 - 15% organic matter |
| Rival | 0.81 L/acre | 1.21 - 1.62 L/acre |
| Treflan EC | 0.73 L/acre | 1.09 - 1.50 L/acre |

Where a rate range is indicated use the higher rate for season long control. Apply in 45 L/acre water. Follow recommended soil preparation, application and incorporation procedures in the *Herbicide Incorporation section*. Implements must be set so asparagus crowns are not injured during soil preparation and incorporation.

***Sencor 500 F (500 g/L), Sencor 75 DF (75%)*** Use only on established asparagus. Controls several broadleaf weeds. *See Table 18.* Apply 0.91 to 1.82 L/acre Sencor 500 F or 0.61 to 1.21 kg/acre Sencor 75 DF in 45 to 120 L/acre water as a pre-emergence broadcast spray. Apply in early spring before asparagus spears or ferns emerge and/or following the last cutting. If the field is to be disked apply the Sencor after disking but before the crop emerges. Do not apply within 4 days of harvest. Leave a minimum of 5 days between application of Sencor and other herbicides. Do not use on newly seeded asparagus nor on young plants during the first growing season after setting crowns. Do not apply to established crops after emergence of spears.

## *Beans*
## *(Snap and Lima)*

### Stale Seedbed

See the *Stale Seedbed Weed Control* section at beginning of Horticulture section.

### Preplant Incorporated

***Eptam 8-E (800 g/L)*** Snap beans only. Controls annual grasses and several broadleaf weeds (Table 18). Spring application only. Apply 1.71 to 2.22 L/acre in at least 45 L/acre water. Eptam must be applied to a dry soil surface of a well prepared seedbed. Incorporate immediately according to instructions in *Herbicide Incorporation* section.

***Rival (500 g/L), Treflan EC (545 g/L)*** Snap Beans only. Spring application only. Controls green and yellow foxtail and several broadleaf weeds (Table 18). **Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Rival or Treflan will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.** For snap beans apply 0.65 to 1.13 L/acre of Rival or 0.61 to 0.81 L/acre of Treflan EC as a spring preplant application in at least 45 L/acre water. See the *Herbicide Incorporation* section for application and incorporation instructions. Rival and Treflan leave a residue in the soil which may affect subsequent crops. See *Table 24* for a list of susceptible crops.

### Postemergence

***Basagran (480 g/L)*** Controls several annual broadleaf weeds (Table 18). Apply 0.7 to 0.91 L/acre in 80 to 160 L/acre water after first trifoliolate leaf stage. Add Assist Oil Concentrate at 0.81 L/acre. Reduce to 0.405 L/acre Assist Oil Concentrate under hot humid conditions. Suppresses Canada thistle and field bindweed with split application of 0.71 L/acre plus 0.71 L/acre applied seven to 15 days later in 80 to 160 L/acre water. Add Assist Oil Concentrate at 0.81 L/acre. Reduce to 0.405 L/acre Assist Oil Concentrate under hot humid conditions. Apply when thistles are 6 to 8 inches (15 to 20 cm) tall. Apply when field bindweed has developed a dark green colour and before it has begun trailing.

Cool weather or drought will delay herbicidal activity and if prolonged, may result in poor weed control. Use of Basagran in hot, humid weather may result in temporary leaf yellowing, leaf flecking, bronzing or burning.

***Hoe-Grass 284 (284 g/L)*** Snap beans only. Controls wild oats, green and yellow foxtail, barnyard grass. Apply 1.42 L/acre in at least 45 L/acre water at a nozzle pressure of 40 psi (275 kPa). Direct nozzles 45° forward. Apply when the weeds are in the one to four leaf stage and before they tiller. Other postemergence herbicides must be applied at least 4 days after Hoe-Grass applications. Do not apply if rain is expected within an hour. Do not apply within 60 days of harvest. Application under hot (above 27° C) or drought conditions will reduce control.

***Poast (184 g/L)*** Controls several grassy weeds (Table 18).

Apply:

| WEED | RATE (L/acre) With Assist | RATE (L/acre) With Merge |
|---|---|---|
| green or yellow foxtail barnyard grass, proso millet, witchgrass and volunteer corn | 0.324 - 0.405 | 0.324 - 0.405 |
| wild oats | 0.57 - 0.65 | 0.57 - 0.65 |
| volunteer wheat and oats | 0.65 | 0.57 - 0.65 |
| volunteer barley | 0.65 - 0.77 | 0.57 - 0.65 |
| quackgrass suppression | 1.78 | 1.10 |

Where a rate range is specified for a weed, use the higher rate to control heavy infestations.

Apply Poast with Assist Oil Concentrate or Merge at 1 L/100 L spray solution. The use of Merge will provide more consistant annual grass control than Assist. Apply with stainless steel 80° flat fan nozzles and use 40 to 45 psi (275 to 300 kPa) pressure. Use 25 to 45 L/acre of water. If weed infestations or crop canopy is dense use 80 L/acre water and apply at 45 psi (300 kPa) nozzle pressure. Apply when the majority of grassy weeds are in the 2 to 5 leaf stage. Control may be reduced if grasses are not actively growing due to drought, flooding or prolonged cool periods (15°C or less). Do not use flood jet or hollow cone nozzles. For quackgrass suppression ensure that quackgrass rhizomes are thoroughly fragmented by spring tillage prior to seeding. Apply Poast at the 1 to 3 leaf stage of the weed in 45 to 60 L/acre of water with Assist Oil Concentrate or Merge at 2 L per 100 L spray solution. Control will be enhanced by inter-row cultivation but do not cultivate sooner than 7 days after application. For aerial recommendations see *Aerial Application* section. Apply no later than 60 days prior to harvest for snap beans and no later than 80 days prior to harvest for lima beans.

Allow 4 days between application of Poast and any other chemicals. Do not seed cereals, forage grasses, corn or other sensitive crops into Poast treated fields for at least 14 days following Poast application. A cultivation to a 4 inch (10 cm) depth is required 7 days prior to re-seeding Poast treated fields to grass crops (such as corn, cereals or forage grasses) in the year of treatment.

***Poast + Power Pack*** Snap beans only. Controls volunteer cereals at reduced rates of Poast as well as annual grasses including green and yellow foxtail, barnyard grass and wild oats. Apply 0.57 L/acre Poast with 1.62 L/acre Ammonium Sulphate and add Assist Oil Concentrate at 1 L/100 L spray solution. Apply when the majority of the grassy weeds are in the 2 to 5 leaf stage in 25 to 45 L/acre water. For heavy infestations or if the crop canopy is heavy use Assist Oil Concentrate at 1 L/100 L spray solution in 80 L/acre water. To mix, partially fill the tank with water while the agitation runs. Add the Ammonium Sulphate to the tank first, then add the correct amount of Poast. Lastly, add the Assist Oil Concentrate and continue filling with water. Use 80° flat fan nozzles and 40 to 45 psi (275 to 300 kPa) pressures. Do not use flood jet or hollow cone nozzles. Allow at least four days between application of Poast and application of broadleaf weed herbicides. Control may be reduced if grasses are under stress due to prolonged cool weather (15° C or less), drought or flooding. Apply no later than 60 days prior to harvest. Do not seed cereals, forage grasses, corn or other sensitive crops into Poast treated fields for at least 14 days following Poast application. A cultivation to a 4 inch (10 cm) depth is required 7 days prior to re-seeding Poast treated fields to grass crops (such as corn, cereals or forage grasses) in the year of treatment.

**CAUTION:** *Ammonium Sulphate is corrosive to metal. Thoroughly clean the sprayer after using Ammonium Sulphate. Do not let mixtures stand in the tank for lengthy periods.*

## *Beets (Red)*

### Stale Seedbed

See *Stale Seedbed Weed Control* at the beginning of the Horticulture section.

### Preplant Incorporated

***Ro-Neet 7.2 E (720 g/L)*** Controls annual grasses and several broadleaf weeds (Table 18). Apply 1.92 to 2.53 L/acre in 80 to 160 L/acre water. Immediately after application, thoroughly incorporate to a depth of 2 to 3 inches (5 to 7 cm) taking care to minimize loss of seedbed moisture. See *Herbicide Information* section for application and incorporation instructions.

### Preemergence

***Bar-fox (83%), NaTA TCA (83%)*** Controls green and yellow foxtail. Apply 2.49 to 3.99 kg/acre product NaTA TCA or 2.73 to 4.05 kg/acre product Bar-fox in 45 L/acre water before the beets emerge. Do not feed tops to livestock. Note: Since TCA acts primarily through the soil there will be variation in activity on different soil types and under different moisture conditions. For best results, soil should be moderately moist at the time of application.

## *Broccoli, Brussel Sprouts, Cabbage, Cauliflower*

### *Direct seeded or transplant*

### Stale Seedbed

See *Stale Seedbed Weed Control* at the beginning of the Horticulture section.

### Preplant Incorporated

***Rival (500 g/L), Treflan EC (545 g/L)*** Use only on transplants of broccoli, brussel sprouts, cabbage or cauliflower and on directed seeded cabbage or cauliflower. Controls green and yellow foxtail and several broadleaf weeds (Table 18). **Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Rival and Treflan will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**For spring application only. Apply 0.65 to 1.13 L/acre of Rival or 0.61 to 0.81 L/acre of Treflan EC in at least 45 L/acre water. See *Herbicide Incorporation* section for application and incorporation instructions. Rival and Treflan leave a residue in the soil which may affect subsequent crops. See *Table 24* for a list of susceptible crops.

### Postemergence

***Excel (90 g/L)*** Broccoli, cabbage and cauliflower only. Controls several grassy weeds (*Table 18*). Apply 1.01 L/acre Excel in 45 L/acre water when the majority of grassy weeds are in the 1 to 4 leaf stage (Do not apply if total leaves including tillers exceeds 6) and when volunteer corn is 2 to 10 inches (5 to 25 cm) tall. Apply with 80° or 110° stainless steel flat fan nozzles angled 45° forward and use 40 psi (275 kPa) pressure. Apply no later than 60 days prior to harvest for cauliflowers and no later than 44 days prior to harvest for broccoli and cabbage. A time interval of 4 days before or after application of Excel is required before any other herbicide or chemical is applied. Do not apply Excel if rain is expected within 3 hours of application. Do not apply Excel by aircraft. Application of Excel in periods of stress will result in significantly reduced weed control. Reduced control is especially likely during periods of prolonged cool (12° C or less) or excessively hot (28° C or greater) day time temperature or low humidity.

## *Carrots*

### Stale Seedbed

See *Stale Seedbed Weed Control* at the beginning of the Horticulture section.

### Preplant Incorporated

***Rival (500 g/L), Treflan EC (545 g/L)*** Controls green and yellow foxtail and several broadleaf weeds. (Table 18). **Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Rival and Treflan will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.** For spring application only. Apply 0.65 to 1.13 L/acre of Rival or 0.61 to 0.81 L/acre of Treflan EC in at least 45 L/acre water. See *Herbicide Incorporation* section for application and incorporation instructions. Rival and Treflan leave a residue in the soil which may affect subsequent crops. See *Table 24 for a list of susceptible crops.*

### Pre-emergence

***Afolan F (480 g/L), Linuron 400 L (400 g/L), Lorox L (480 g/L)*** Controls barnyard grass, green and yellow foxtail and several broadleaf weeds (*Table 18*).

Apply after planting but prior to crop emergence:

| HERBICIDE | RATES | |
|---|---|---|
| | loam or clay soil with low organic matter | muck or clay soil with medium organic matter |
| Afolan F | 0.53 to 0.77 L/acre | 0.77 to 1.01 L/acre |
| Linuron 400 L | 0.61 to 0.81 L/acre | 0.81 to 1.11 L/acre |
| Lorox L | 0.45 L/acre | 1.38 L/acre |

Do not use on sandy or coarse textured soils low in organic matter (less than 3%). Plant seed at least 0.6 inches (1.5 cm) deep. Rain or irrigation is needed to carry the chemical into the root zone of germinating weeds. If unusually heavy rains follow application severe injury to carrots may result. Do not replant to any other crop within 4 months after application. If initial seeding of carrots fails to produce a stand, the same crop may be reseeded into soil treated with these herbicides. Thoroughly rework soil before replanting. Do not retreat field with second application of Linuron 400 L or Afolan F or Lorox as injury to the crop may result. Do not make more than one application per season.

### Postemergence

***Afolan F (480 g/L), Lorox L (480 g/L)*** Apply only if carrots have not had a pre-emergence treatment of Afolan F, Linuron 400 L or Lorox. Controls barnyard grass, green and yellow foxtail and several broadleaf weeds. (Table 18) Apply Afolan F at 0.77 to 1.9 L/acre or Lorox L at 0.91 to 1.82 L/acre in 90 to 130 L/acre water. Follow detailed mixing instructions on the product label. Use 50 mesh or larger line strainers or screens. A pump of sufficient capacity to provide adequate volume through the bypass and/or jet agitation system must be used. This will prevent settling-out while spraying.

Do not apply with greater than 40 psi (275 kPa) pressure. Spray when carrots have 2 or more fully developed leaves. Use lower rates on small seedling weeds and higher rates on larger established weeds. Apply before annual grasses exceed 2 inches (5 cm) in height or before broadleaf weeds exceed 6 inches (15 cm). During hot, dry weather, spray in the cool part of the day to avoid injury. Note: Plant seed at least 0.5 inches (1.3 cm) deep. Do not apply when temperature exceeds 32° C, as crop injury may result. Note: Afolan F or Lorox may be applied following Agricultural Weedkiller No. 1, provided treatments are at least 1 day apart. Agricultural Weedkiller No. 1 may be applied following Afolan F or Lorox L, allowing a 2 week interval between application of Afolan F or Lorox L and Agricultural Weedkiller No. 1. Shorter intervals may cause crop damage. Do not tank mix Afolan F or Lorox L with Agricultural Weedkiller No. 1 or surfactants.

***Agricultural Weedkiller No. 1 (100%)*** Controls barnyard grass and several broadleaf weeds (Table 18). Apply 240 to 320 L/acre as an overall treatment when carrots are in the 2 to 4 leaf stage and before weeds are 4 inches (10 cm) tall. Spray in evening when humidity is high and winds are light. Do not apply within 30 days of harvest. **Caution: See Note under *Afolan F/Lorox* recommendation.**

***Hoe-Grass 284 (284 g/L)*** Controls wild oats, green and yellow foxtail and barnyard grass. Apply 1.42 L/acre in at least 45 L/acre water at a nozzle pressure of 40 psi (275 kPa). Direct nozzles 45° forward. Apply when the weeds are in the one to four leaf stage and before they tiller. Other postemergence herbicides must be applied at least four days after Hoe-Grass 284 application. Do not apply if rain is expected within one hour. Do not apply within 60 days of harvest. Application under hot (above 27° C) or drought conditions will reduce weed control.

***Lorox L*** see Afolan F.

## Celery

### Postemergent to weeds, 8 to 10 days after transplanting and new growth has started.

***Afolan F (480 g/L)*** Controls barnyard grass, green and yellow foxtail and several broadleaf weeds (Table 18). Apply 0.77 to 1.01 L/acre in 80 to 160 L/acre water on loam or clay soils with low organic matter or 1.01 to 1.9 L/acre in 80 to 160 L/acre water on muck or clay soil with medium organic matter. Do not apply under hot conditions. Do not apply with greater than 275 kPa (40 psi) pressure. Read product label for detailed mixing instructions. Use 50 mesh or larger screens and line strainers. A pump of sufficient capacity to provide adequate volume through the bypass and/or jet agitation system must be used. This will prevent settling out while spraying.

## Corn (Sweet)

### Stale Seedbed

See *Stale Seedbed Weed Control* at the beginning of the Horticulture section.

### Preplant Incorporated

***Dual (960 g/L)*** Controls green and yellow foxtail and barnyard grass. Apply 0.81 to 1.11 L/acre in a minimum of 60 L/acre water. Use the higher rate for heavy weed infestations. Incorporate in the top 2 inches (five cm) of soil with a tandem disc, vibrating shank cultivator or harrows set to work the soil no deeper than 4 inches (10 cm). Immediate incorporation is not required. Do not use on peat or muck soils. Heavy rainfall conditions following application of Dual may result in reduced weed control, especially on sandier soil types. See *Herbicide Incorporation* section for incorporation instructions.

***Eradicane 8-E (800 g/L)*** Controls several grasses and broadleaf weeds (Table 18). Apply at 1.72 to 2.23 L/acre in at least 45 L/acre water to the dry soil surface of a well prepared seedbed. Spray and incorporate immediately. Plant seed to a maximum depth of 2 inches (five cm). See *Herbicide Incorporation* section for information on incorporation.

*The level of weed control may be reduced when Eradicane is used on soils which have been treated with Eradicane, Eptam or Sutan + the previous growing season. It is anticipated that the reduction in control will be greater where Eradicane, Eptam or Sutan + has been used repeatedly for two or more years.*

***Primextra (500 g/L)*** Controls green and yellow foxtail, barnyard grass and several broadleaf weeds (Table 18). Apply 2.71 to 3.44 L/acre in a minimum of 60 L/acre water. Do not use on peat or muck soils, or on coarse textured soils low in organic matter. Use the higher rate when heavy weed infestations are expected. Incorporate thoroughly into 2 inches (5 cm) of soil prior to planting. Immediate incorporation is not necessary. Heavy rainfall conditions following application of Primextra may result in reduced weed control, especially on sandier soil types. See *Herbicide Incorporation* section for incorporation instructions. This treatment may leave a residue in the soil the following year.

Primextra contains atrazine. Any treatments containing atrazine leave a residue in the soil which may affect the subsequent crop. For rotational corn, non-residual treatments are preferred to allow cropping flexibility. Triazine tolerant canola is tolerant to residues from field applications of atrazine. Flax, peas and fababeans have some tolerance and are usually not affected by residues from recommended rates of Primextra. Other crops should not be sown the year following Primextra application.

***Sutan + (800 g/L)*** Controls green and yellow foxtail and barnyard grass. Apply 1.72 to 2.23 L/acre in a minimum of 45 L/acre water to a dry soil surface of a well prepared seedbed. Spray and incorporate immediately. Do not seed deeper than 2 inches (5 cm). See *Herbicide Incorporation* section for incorporation instructions. Follow Sutan+ application with a recommended postemergence herbicide to control broadleaf weeds if necessary.

*The level of weed control will be reduced where Sutan + is used on soils which have been treated with Eradicane, Eptam or Sutan + the previous growing season. It is anticipated that the reduction in control will be greater where Eradicane, Eptam or Sutan + has been used repeatedly for two or more years.*

## Postemergence

**For corn less than 6 inches (15 cm) tall (leaf outstretched) the following treatments may be applied as an overall spray.**

***Basagran (480 g/L)*** Controls several broadleaf weeds (Table 18). Apply 0.71 to 0.91 L/acre in 80 to 160 L/acre water. Add Assist Oil Concentrate at 0.81 L/acre. Reduce Assist Oil concentrate to 0.405 L/acre under hot, humid weather conditions. Use the lower rate to control lady's thumb and annual smartweed species 1 to 3 inches (2.5 to 7.5 cm) high, wild mustard 1 to 5 inches (2.5 to 12.5 cm) high, or cocklebur 3 to 7 inches (7.5 to 17.5 cm) high. Use the higher rate to control lady's thumb and annual smartweed species 3 to 8 inches (7.5 to 20 cm) high, wild mustard 5 to 10 inches (12.5 to 25 cm) high, cocklebur 7 to 12 inches (17.5 to 30 cm) high, and seedlings of other susceptible weeds.

Basagran also suppresses top growth of Canada thistle and field bindweed (patch treatment). Apply a split application of 0.71 L/acre plus 0.71 L/acre 7 to 15 days later. Apply in 80 to 160 L/acre water, when thistles are 6 to 8 inches (15 to 20 cm) tall and when field bindweed has developed a dark green color and before it has begun trailing. Add Assist Oil Concentrate at 0.81 L/acre. Reduce Assist Oil Concentrate to 0.405 L/acre under hot, humid weather conditions.

Best results are obtained when Basagran is applied under warm temperatures (21° C or greater). Cool weather or drought will delay herbicidal activity and if prolonged, may result in poor weed control. Use of Basagran in hot, humid weather may result in temporary leaf yellowing, leaf flecking, bronzing or burning.

***Buctril M (560 g/L)*** Controls several broadleaf weeds (Table 18). Apply 0.405 L/acre in 80 to 120 L/acre water at a pressure of 40 psi (275 kPa) when corn is in the 4 to 6 leaf stage and weed seedlings are small. Leaf scorch may occur if application is made under hot, humid conditions or under excessively cool wet weather.

***Kil-mor (485 g/L)*** Controls several broadleaf weeds (Table 18). Apply 0.343 to 0.445 L/acre in a minimum of 80 L/acre water as an overall spray before corn reaches 6 inches (15 cm) in height (top leaf extended) and before weeds reach 4 inches (10 cm) in height.

Do not apply Kil-Mor when temperatures are above 27° C and the relative humidity is high. Under certain environmental conditions (eg. extended periods of either cold or hot dry weather), corn may become brittle after applying Kil-mor. Do not cultivate for 2 weeks following application. Heavy winds during the 2 week period following application may cause some stalk lodging.

Do not apply Kil-mor in the interval between 6 to 12 inches (15 to 30 cm) in height of corn. For corn over six inches (15 cm) tall see *Directed Postemergence* recommendation in this section.

***2,4-D Amine*** Controls several broadleaf weeds (Table 18). Apply 0.339 to 0.45 L/acre of formulations containing 500 g/L 2,4-D amine in 45 L/acre water as an overall spray until corn is 6 inches (15 cm) tall (leaf outstretched), after which a directed spray should be used. See *Directed Postemergence* recommendations in this section. For product volumes of other formulations of 2,4-D amine see Table 21.

**For corn over 6 inches (15 cm) tall the following treatments may be applied as an overall spray.**

***Pardner (280 g/L)*** Controls several broadleaf weeds (Table 18). Apply 0.405 to 0.485 L/acre in at least 80 to 120 L/acre water. Apply when corn is in the 4 to 8 leaf stage and before the weeds are past the 4 leaf stage. Do not use under conditions of high humidity and high temperature (greater than 27 °C) or crop injury may occur.

### Directed Postemergence

**For corn over 6 inches (15 cm) tall (leaf outstretched). Application of these herbicides requires positioning of the nozzles to direct spray to the base of the corn plant. Severe damage is likely if the crop leaves are sprayed.**

***Kil-mor (485 g/L)*** Controls several broadleaf weeds (Table 18). Do not apply Kil-mor in the interval between 6 to 12 inches (15 to 30 cm) in height of corn. When the crop is beyond 12 inches (30 cm) in height apply using drop nozzles. Do not allow the spray solution to contact the corn stalk above the point where the first leaf meets the stem. Apply 0.343 to 0.445 L/acre in a minimum of 100 to 120 L/acre of water.

Under certain environmental conditions (eg. extended periods of either cold or hot dry weather), corn may become brittle after applying Kil-mor. Do not cultivate for 2 weeks following application. Heavy winds during the 2 week period following application may cause some stalk lodging. Do not apply when temperatures are above 27° C and the relative humidity is high.

***2,4-D Amine*** Controls several broadleaf weeds. (Table 18) Apply 0.61 L/acre of formulations containing 500 g/L 2,4-D amine in 45 to 90 L/acre water according to the species and stage of weeds present. Treat by directing spray to base of plant after corn is more than 6 inches (15 cm) tall (leaf outstretched). For product volumes of other formulations of 2,4-D amine, see Table 21.

## *Cucumbers*

### Stale Seedbed

See *Stale Seedbed Weed Control* at the beginning of the Horticulture section.

### Preplant Incorporated

***Alanap 3 (240 g/L)*** Controls green and yellow foxtail and several broadleaf weeds (Table 18). Apply 3.84 to 7.69 L/acre Alanap 3. Apply in 100 to 120 L/acre water. Incorporate lightly 0.4 to 1.2 inches (1 to 3 cm). Use lower rate on light sandy soils.

***Prefar (480 g/L)*** Controls barnyard grass, green and yellow foxtail. Apply 4.86 to 5.67 L/acre in 45 to 200 L/acre water. Incorporate 1 to 2 inches (2.5 to 5 cm) deep. *Do not apply Prefar more often than once every 12 months. To avoid crop injury rotate only to cucumbers, peppers, cole crops, carrots, lettuce or tomatoes.*

### Postemergence

***Poast (184 g/L)*** Controls several grassy weeds. See *Table 18.*

Apply:

| WEED | RATE (L/acre) With Assist | RATE (L/acre) With Merge |
|---|---|---|
| green or yellow foxtail, barnyard grass, proso millet witchgrass and volunteer corn | 0.324 - 0.405 | 0.324 - 0.405 |
| wild oats | 0.57 - 0.65 | 0.57 - 0.65 |
| volunteer wheat and oats | 0.65 | 0.57 - 0.65 |
| volunteer barley | 0.65 - 0.77 | 0.57 - 0.65 |
| quackgrass suppression | 1.78 | 1.10 |

Where a rate range is specified for a weed, use the higher rate to control heavy infestations. Apply Poast in 25 to 45 L/acre of water with Assist Oil Concentrate or Merge at 1 L/100 L spray solution. The use of Merge will provide more consistent annual grass control than Assist. Apply with stainless steel 80° flat fan nozzles and use a minimum pressure of 35 psi (240 kPa). If weed infestation or crop canopy is dense, use 80 L/acre of water and 45 psi (300 kPa) nozzle pressures. Apply when the majority of annual grassy weeds are in the 2 to 5 leaf stage. Control may be reduced if grasses are not actively growing due to drought, flooding or prolonged cool periods (15° C or less). Do not use flood jet or hollow cone nozzles. Do not harvest within 30 days of treatment.

For suppression of quackgrass ensure that quackgrass rhizomes are thoroughly fragmented by spring tillage prior to seeding. Apply Poast with Assist or Merge at the 1 to 3 leaf stage of the weed in 45 to 60 L/acre of water with Assist Oil Concentrate or Merge at 2 L/100 L spray solution. Control will be enhanced by inter-row cultivation but do not cultivate sooner than 7 days after application. Do not tank mix with other herbicides. Allow at least 4 days between application of Poast and application of other herbicides. Do not seed cereals, forage grasses, corn or other susceptible crops into Poast treated fields for at least 14 days following Poast application. A cultivation to a 4 inch (10 cm) depth is required 7 days prior to re-seeding Poast treated fields to grass crops (such as corn, cereals or forage grasses) in the year of treatment.

***Poast + Power Pack*** Controls volunteer cereals at reduced rates of Poast. Also controls annual grasses including green and yellow foxtail, barnyard grass and wild oats. Apply 0.57 L/acre Poast with 1.62 L/acre Ammonium Sulphate and Assist Oil Concentrate at 1 L/100 L spray solution. Apply when the majority of the annual grasses are in the 2 to 5 leaf stage in 25 to 45 L/acre water. For heavy infestations use 80 L/acre water. Use 80° flat fan nozzles with pressures of 40 to 45 psi (275 to 300 kPa). Do not use flood jet or hollow cone nozzles.

To mix, partially fill the tank with water. While the agitation runs add the Ammonium Sulphate to tank first, then add the correct amount of Poast. Lastly, add the Assist Oil Concentrate and continue filling with water. Control will be enhanced by inter-row cultivation but do not cultivate sooner than 7 days after application. Control may be reduced if grasses are stressed due to prolonged cool conditions (15° C or less), flooding or drought.

Do not mix broadleaf weed herbicides with Poast when using the Power Pack. Allow at least 4 days between application of Poast Power Pack and application of broadleaf weed herbicides. Do not seed cereals, forage grasses, corn or other sensitive crops into Poast treated fields for at least 14 days following Poast application. A cultivation to a 4 inch (10 cm) depth is required 7 days prior to re-seeding Poast treated fields to grass crops (such as corn, cereals or forage grasses) in the year of treatment.

Ammonium Sulphate is corrosive to metal. Thoroughly clean the sprayer after using Poast + Power Pack. Do not let this mixture stand in the tank for lengthy periods.

## *Onions*

### Stale Seedbed

See *Stale Seedbed Weed Control* at the beginning of the Horticulture section.

### Postemergence

***Excel (90 g/L)*** (*Dry bulb onions only*) Controls several grassy weeds (*Table 18*). Apply 1.01 L/acre Excel in 45 L/acre water when the majority of annual grass weeds are in the 1 to 4 leaf stage (Do not apply if total leaves including tillers exceeds 6.) and when volunteer corn is 2 to 10 inches (5 to 25 cm) tall. Apply with 80° or 110° stainless steel flat fan nozzles angled 45°, and use 275 kPa (40 psi) pressure. Apply no later than 60 days prior to harvest. A time interval of 4 days before or after application of Excel is required before any other herbicide is applied. Do not apply Excel if rain is expected within 3 hours of application. Do not apply Excel by aircraft. Application of Excel in periods of stress will significantly reduce weed control. Reduced weed control is especially likely during periods of prolonged cool (12° C or cooler) or excessively hot (28° C or greater) day time temperatures or low humidity.

**Fusilade (250 g/L)** Controls several grassy weeds. See Table 18. Apply the rate appropriate for the weeds to be controlled according to the following table.

| WEED | LEAF STAGE | RATE (L/acre) |
|---|---|---|
| volunteer corn | 2 - 5 | 0.243 |
| barnyard grass, volunteer wheat, volunteer barley | 2 - 4 | 0.324 |
| wild oats, proso millet | 2 - 4 | 0.405 |
| green and yellow foxtail | 2 - 4 | 0.57 |
| quackgrass suppression | 3 - 5 | 0.81 |

Apply at the recommended leaf stage in 45 to 120 L/acre of water using flat fan nozzles and a pressure of 30 to 40 psi (200 to 275 kPa). Add Agral 90 at a rate of 0.1 L/100 L of spray solution. Do not apply after tillering of annual grass weeds. For quackgrass suppression in annual crops ensure that rhizomes are thoroughly fragmented by spring tillage prior to seeding. Quackgrass plants more than 8 inches (20 cm) in height or which have reached the heading stage will not be controlled. Fusilade effectiveness will be reduced when plants are stressed by lack of moisture, excess moisture, flooding, low temperatures or very low relative humidity. Do not apply if rainfall is expected within 2 hours of application. Do not tank mix with other herbicides or fertilizers. Other herbicides must be applied at least 3 days after Fusilade. Do not reseed sensitive crops within 60 days of application. Avoid drift onto sensitive crops (corn, cereals, forage grasses and turf). Do not apply by air.

A repeat application of the 0.405 L/acre rate may be applied if required but not less than 42 days before harvest.

Do not apply the 0.405 L/acre rate within 42 days of harvest or the 0.81 L/acre rate within 60 days of harvest.

Experimental feeding studies have demonstrated that the active ingredient in this product can produce birth defects and other adverse effects in the developing fetus of rats. Women capable of bearing children should be particularly careful when handling this product. Occupational exposure to this product will be reduced by strict adherence to the handling precautions and use directions provided on the product label.

***Goal (192 g/L)*** Controls several broadleaf weeds (Table 18). Use in dry bulb onions only. Apply 0.253 L/acre in at least 200 L/acre water at a nozzle pressure of 40 psi (275 kPa). Apply when the weeds are in the 2 to 4 leaf stage and actively growing. The first application can be made when the onions have 2 fully developed true leaves. More than one application may be necessary to control later germinating weeds. Do not apply in excess of 1.01 L/acre in one year. Do not apply Goal when the crop or weeds are under stress from excess or lack of moisture, extreme temperatures or injury from a previously applied herbicide. Do not apply within 56 days of harvest. Do not apply preemergent or prior to the 2 leaf stage or severe injury to the onions may occur.

***Hoe-Grass 284 (284 g/L)*** Dry bulb onions only. Controls wild oats, green and yellow foxtail, barnyard grass. Apply 1.41 L/acre in at least 45 L/acre water at a nozzle pressure of 40 psi (275 kPa). Direct nozzles 45° forward. Apply when the weeds are in the 1 to 4 leaf stage and before they tiller. Other postemergence herbicides must be applied at least 4 days after Hoe-Grass 284 application. Do not apply if rain is expected within one hour. Application under hot (above 27° C) or drought conditions will result in reduced weed control. Do not apply within 60 days of harvest.

**Poast (184 g/L)** Controls several grassy weeds. See Table 18.

Apply:

| WEED | RATE (L/acre) With Assist | RATE (L/acre) With Merge |
|---|---|---|
| green or yellow foxtail, barnyard grass, proso millet, witchgrass and volunteer corn | 0.324 - 0.405 | 0.324 - 0.405 |
| wild oats | 0.57 - 0.65 | 0.57 - 0.65 |
| volunteer wheat and oats | 0.65 | 0.57 - 0.65 |
| volunteer barley | 0.65 - 0.77 | 0.57 - 0.65 |
| quackgrass suppression | 1.78 | 1.10 |

Where a rate range is specified for a weed, use the higher rate to control heavy infestations.

Apply Poast with Assist Oil Concentrate or Merge at 1 L/100 L spray solution. The use of Merge will provide more consistent annual grass control than Assist. Apply in 25 to 45 L/acre water with stainless steel 80° flat fan nozzles and use 40 to 45 psi (275 to 300 kPa) pressure. Do not use flood jet or hollow cone nozzles. If weed infestation or crop canopy is dense, use 80 L/acre of water and 45 psi (300 kPa) nozzle pressure. Apply when the majority of annual grassy weeds are in the 2 to 5 leaf stage. Control may be reduced if grasses are not actively growing due to drought, flooding or prolonged cool periods (15 °C or less).

For suppression of quackgrass, rhizomes should be thoroughly fragmented by spring tillage prior to seeding. Apply Poast at the 1 to 3 leaf stage of the quackgrass in 45 to 80 L/acre of water with Assist or Merge at 2 L/100 L spray solution. Control will be enhanced by inter-row cultivation but do not cultivate sooner than 7 days after application. Poor results will occur if the quackgrass is not actively growing at the time of treatment. Apply no later than 50 days prior to harvest. Allow at least 4 days between application of Poast and application of other pesticides. Do not seed cereals, forage grasses, corn or other sensitive crops into Poast treated fields for at least 14 days following Poast application. A cultivation to a depth of 4 inches (10 cm) is required 7 days prior to re-seeding Poast treated fields to grass crops (such as corn, cereals or forage grasses) in the year of treatment.

***Poast + Power Pack*** Controls volunteer cereals at reduced rates of Poast as well as annual grassy weeds including green and yellow foxtail, barnyard grass and wild oats. Apply 0.57 L/acre Poast with 1.62 L/acre Ammonium Sulphate and Assist Oil Concentrate at 1 L/100 L spray solution in 25 to 45 L/acre water when the majority of the annual grasses are in the 2 to 5 leaf stage. For heavy infestations use 45 to 80 L/acre water. To mix, partially fill the tank with water. While the agitation runs, add the Ammonium Sulphate to the tank first, then add the correct amount of Poast. Lastly, add the Assist and continue filling with water. Use 80 ° flat fan nozzles and pressures of 40 to 45 psi (275 to 300 kPa). Do not use flood jet or hollow cone nozzles. Reduced control may occur if grasses are stressed due to flooding, drought or prolonged cool conditions (15 °C or lower).

Apply no later than 50 days prior to harvest. Allow at least 4 days between application of Poast and other pesticides. Do not seed cereals, forage grasses, corn or other sensitive crops into Poast treated fields for at least 14 days following Poast application. A cultivation to a 4 inch (10 cm) depth is required 7 days prior to reseeding Poast treated fields to grass crops (such as corn, cereals, or forage grasses) in the year of treatment.

*Ammonium Sulphate is corrosive to metal. Thoroughly clean the sprayer after use of Poast + Power Pack. Do not let this mixture stand in the tank for lengthy periods of time.*

## Parsnips

### Pre-emergence

***Afolan F (480 g/L), Linuron 400 L (400 g/L)*** Controls barnyard grass, green and yellow foxtail and several broadleaf weeds. (*Table 18*).

Apply after seeding:

| HERBICIDE | RATE | |
|---|---|---|
| | loam or clay soil with low organic matter | muck or clay soil with medium organic matter |
| Afolan F | 0.53 to 0.77 L/acre | 0.77 to 1.01 L/acre |
| Linuron 400 L | 0.61 to 0.81 L/acre | 0.81 to 1.11 L/acre |

Do not use on sand or coarse textured soils low in organic matter (less than 3%). Plant seed at least 0.5 inches (1.5 cm) deep. Rainfall or irrigation is needed to carry the chemical to the root zone of germinating weeds. If unusually heavy rains follow application severe injury to parsnips may occur. Do not replant to any other crop within 4 months of application. If initial seeding of parsnips fails to produce a stand, the same crop may be replanted in soil treated with Afolan F or Linuron 400 L. Thoroughly rework soil before replanting. Do not re-treat field with a second application of Linuron 400 L or Afolan F as crop injury may result. Do not make more than one application per season.

### Postemergence

***Afolan F (480 g/L)*** Apply only if parsnips have not had a preemergence treatment of Afolan F or Linuron 400 L. Controls barnyard grass, green and yellow foxtail and several broadleaf weeds (Table 18). Apply 0.77 to 1.9 L/acre in 90 to 135 L/acre water. If parsnips are planted on sandy soils do not apply more than 1.01 L/acre. Do not apply with pressure greater than 40 psi (275 kPa). Spray when parsnips have 2 or more fully developed leaves. Use lower rates on small seedling weeds and the higher rates on larger established weeds. Apply before annual grasses exceed 2 inches (5 cm) in height and before broadleaves exceed 6 inches (15 cm). During hot, dry weather spray in the cool part of the day to avoid injury. Refer to product label for detailed mixing instructions. Use 50 mesh line strainers or screens. A pump of sufficient capacity to provide adequate volume through the bypass and/or jet agitation system must be used. This will prevent settling-out while spraying. Afolan F may be applied after Agricultural Weedkiller No. 1 provided treatments are at least 24 hours apart.

Agricultural Weedkiller No. 1 may be applied following Afolan F, allowing a 2 week interval between Afolan F and herbicidal oil.

***Agricultural Weedkiller No. 1 (100%)*** Controls barnyard grass and several broadleaf weeds (Table 18). Apply 240 to 320 L/acre as an overall treatment when crop is in the 2 to 4 leaf stage and before weeds are 4 inches (10 cm) tall. Spray in evening when humidity is high and the winds are light. Do not apply within 30 days of harvest.

*Do not mix Agricultural Weedkiller No. 1 with other herbicides. If Afolan F is applied, wait 2 weeks before applying Agricultural Weedkiller No. 1. If Agricultural Weedkiller No. 1 is applied first, wait at least 24 hours before applying Afolan F.*

## Peppers

**No registered herbicides for this crop.**

## Potatoes

Timely tillage with harrows, mulchers and cultivators supplemented with chemical weed control can be used to effectively control most weeds in potatoes. Timing of operations and chemical control measures must be selected for specific field conditions and weed problems.

### Stale Seedbed

See *Stale Seedbed Weed Control* at the beginning of the Horticulture section.

### Preplant Incorporated

***Dual (960 g/L)*** Controls green and yellow foxtail and barnyard grass. Apply 0.81 to 1.11 L/acre in a minimum of 60 L/acre water. Use the higher rate for heavy weed infestations. Incorporate in the top 2 inches (5 cm) of soil with a tandem disc, vibrating shank cultivator or harrows set to work the soil no deeper than 4 inches (10 cm). Immediate incorporation is not required. Do not use on peat or muck soils. Heavy rainfall conditions following application of Dual may result in reduced weed control, especially on sandier soil types. *See Herbicide Incorporation section* for incorporation instructions. A postemergent treatment with either Lexone or Sencor will be required for broadleaf weed control.

***Eptam 8-E (800 g/L)*** Controls several annual grasses and broadleaf weeds (Table 18).

*Spring application*

Apply 1.72 to 2.23 L/acre in at least 45 L/acre water. Eptam must be applied to the dry soil surface of a well prepared seedbed. Incorporate immediately according to instructions in the *Herbicide Incorporation* section. *The level of weed control will be reduced where Eptam is used on soils which have been treated with Eradicane, Eptam or Sutan the previous growing season. It is anticipated that the reduction in control will be greater where these herbicides have been used repeatedly for two or more years.*

*Fall application*

Although registered for fall application, the application and incorporation requirements for Eptam predispose soils to erosion and this use is not recommended.

*Quackgrass control*

Spring application. Apply 2.83 to 3.44 L/acre in at least 45 L/acre water. Spray on a dry soil surface. Incorporate immediately according to instructions in the *Herbicide Incorporation* section. Quackgrass must be cut up so that remaining rhizomes have 4 or less nodes prior to application.

Eptam 8-E may be applied with liquid fertilizer or on granular fertilizer. See the *Herbicide Incorporation* section for specific instructions regarding application and use on dry fertilizer.

***Eptam 8-E (800 g/L) plus Lexone L (480 g/L) or Lexone DF (75%) or Sencor 500 F (500 g/L) or Sencor 75 DF (75%)*** Controls annual grasses and several broadleaf weeds. See Table 18. Apply a tank mix of 0.22 to 0.34 L/acre Lexone L or 0.142 to 0.223 kg/acre of Lexone DF or 0.222 to 0.343 L/acre Sencor 500 F or 0.151 to 0.222 kg/acre Sencor 75 DF tank mixed with 1.70 to 2.23 L/acre Eptam 8-E. Do not use on red-skinned or early potatoes or on varieties Belleisle, Tobique or Shepody or on soil with greater than 7 per cent organic matter or less than 2 per cent organic matter. Refer to *Herbicide Incorporation* section for incorporation instructions.

*Fall seeded cover crops such as wheat, oats and rye may be injured when seeded the same season as application of Lexone or Sencor. Rapeseed (except triazine tolerant Canola), sunflowers, sugar beets and several horticulture crops may be sensitive to Sencor residue the year following application. After harvest tillage practices that provide thorough mixing of the soil may be helpful in reducing the chance of injury to succeeding crops. The level of weed control will be reduced where Eptam is used on soils which have been treated with Eradicane, Eptam or Sutan the previous growing season. It is anticipated that the reduction in control will be greater where these herbicides have been used repeatedly for two or more years.*

### Preemergence

***Eptam 8-E (800 g/L) - drag-off*** Controls several annual grasses and broadleaf weeds (Table 18). Apply 1.72 to 3.44 L/acre. The field must first be "dragged-off", followed by Eptam 8-E application and incorporation. Use spike toothed harrows or cultivation equipment for incorporation. Refer to *Herbicide Incorporation* section for further incorporation and rate instructions.

***Gramoxone (200 g/L)*** Controls annual grasses, broadleaf weeds and top growth of perennial weeds. Apply 1.11 to 2.22 L/acre in 120 to 445 L/acre clean water to emerged weeds. Use the higher rate when weeds are above 2 inches (5 cm) in height and the higher volume of water on dense weed growth. Do not apply if more than 30 per cent of the potatoes have emerged. Do not apply to emerged plants in the evening, under cloudy conditions, or when plants are under moisture stress. Potatoes grown for early harvest should not be treated after emergence.

***Gramoxone (200 g/L) plus Lexone DF (75%)*** Controls annual grasses, broadleaf weeds and top growth of perennial weeds. Apply a tank mix of 0.336 to 0.49 kg/acre Lexone DF plus 1.11 L/acre Gramoxone as a pre-emergence broadcast application to potatoes, after the weeds have emerged up to and including ground crack. Use the lower rate of Lexone on light soils, the higher rate on heavier and high organic matter soils. Do not apply after ground crack when tops have emerged or excessive injury may result. Fall seeded cover crops such as wheat, oats and rye may be injured when seeded the same season as application of Lexone. Rapeseed (except triazine tolerant canola), sunflowers, sugar beets and several horticulture crops may be sensitive to Lexone residue the year following application. Post-harvest tillage practices that provide thorough mixing of the soil may be helpful in reducing the chance of injury to succeeding crops.

***Laredo (356 g/L), Roundup (356 g/L), Wrangler (356 g/L)*** Controls annual weeds. Apply 0.91 L/acre in at least 45 L/acre water to actively growing grasses and broadleaf weeds less than 6 inches (15 cm) tall. If weeds are over 6 inches (15 cm) tall apply 1.42 L/acre. Apply to emerged weeds before or after planting, but before potatoes show above ground. Do not apply after potato emergence as Laredo, Roundup or Wrangler will kill all green vegetation. Allow at least 3 days after treatment before disturbing the soil. Heavy rainfall within 2 hours after application may wash chemical off the foliage and a repeat treatment may be required. Rainfall within 6 hours after application may reduce effectiveness.

Refer to the *Perennial Weed Control on Cropland* section and the *Special Weed Problems* section for information on growth stages and rates of application for control of perennial weeds.

## Postemergence

***Excel (90 g/L)*** Controls several annual grassy weeds (*Table 18*). Apply 1.01 L/acre Excel in 45 L/acre water when the majority of annual grass weeds are in the 1 to 4 leaf stage (Do not apply if total leaves including tillers exceed 6.) and when volunteer corn is 2 to 10 inches (5 to 25 cm) tall. Apply at 275 kPa (40 psi) with 80° or 110° stainless steel flat fan nozzles angled 45° forward. Apply no later than 60 days prior to harvest. A time interval of 4 days before or after application of Excel is required before any pesticide or other chemical is applied. Do not apply Excel if rain is expected within 3 hours of application. Do not apply Excel by aircraft. Application of Excel in periods of stress will significantly reduce weed control. Reduced weed control is especially likely during periods of prolonged cold (12° C or cooler) or excessively hot (28° C or greater) day time temperature or low humidity.

***Eptam 8-E (800 g/L) Sprinkler Irrigation*** Controls annual grasses and several broadleaf weeds (Table 18). Meter 1.72 to 2.22 L/acre into first irrigation water following a clean cultivation. Do not apply within 45 days of harvest.

***Fusilade (250 g/L)*** Controls several grassy weeds. See Table 18. Apply the rate appropriate for the weeds to be controlled according to the following table.

| WEED | LEAF STAGE | RATE (L/acre) |
|---|---|---|
| volunteer corn | 2 - 5 | 0.243 |
| barnyard grass, volunteer wheat, volunteer barley | 2 - 4 | 0.324 |
| wild oats, proso millet | 2 - 4 | 0.405 |
| green and yellow foxtail | 2 - 4 | 0.57 |
| quackgrass suppression | 3 - 5 | 0.81 |

Apply at the recommended leaf stage in 45 to 120 L/acre of water using flat fan nozzles and a pressure of 30 to 40 psi (200 to 275 kPa). Add Agral 90 at a rate of 0.1 L/100 L of spray solution. Do not apply after tillering of annual grass weeds. For quackgrass suppression in annual crops ensure that rhizomes are thoroughly fragmented by tillage in the spring prior to application. Quackgrass plants more than 8 inches (20 cm) in height or which have reached the heading stage will not be controlled. Fusilade effectiveness will be reduced when plants are stressed by lack of moisture, excess moisture, flooding, low temperatures or very low relative humidity. Do not apply if rainfall is expected within 2 hours of application. Do not tank mix with other herbicides or fertilizers. Other herbicides must be applied at least 3 days after Fusilade. Do not reseed sensitive crops within 60 days of application. Avoid drift onto sensitive crops (corn, cereals, forage grasses and turf). Do not graze or feed treated crops during the year of treatment. Do not apply by air. Do not apply within 90 days of harvest.

Experimental feeding studies have demonstrated that the active ingredient in this product can produce birth defects and other adverse effects in the developing fetus of rats. Women capable of bearing children should be particularly careful when handling this product. Occupational exposure to this product will be reduced by strict adherence to the handling precautions and use directions provided on the product label.

***Hoe-Grass 284 (284 g/L)*** Controls wild oats, green and yellow foxtail, barnyard grass. Apply 1.42 L/acre in at least 45 L/acre water at a nozzle pressure of 40 psi (275 kPa). Direct nozzles 45° forward. Apply when weeds are in the 1 to 4 leaf stage, and before they tiller. Other postemergent herbicides must be applied at least 4 days after Hoe-Grass 284 application. Do not apply if rain is expected within 1 hour. Application under hot (above 27° C) or drought conditions will result in reduced weed control. Do not apply within 60 days of harvest.

***Lexone DF (75%), Lexone L (480 g/L)*** Controls several broadleaf weeds. See Table 18. Apply 0.222 L/acre Lexone L or 0.141 kg/acre Lexone DF in 45 to 120 L/acre water. Apply early postemergence soon after potatoes emerge and before weeds are 1.6 inches (4 cm) high.

Do not use on red-skinned, Shepody, Belleisle, Tobique or any early maturing varieties. Do not apply within 60 days of harvest.

***Poast (184 g/L)*** Controls several grassy weeds (Table 18).

Apply:

| WEED | RATE (L/acre) With Assist | RATE (L/acre) With Merge |
|---|---|---|
| green or yellow foxtail, barnyard grass, proso millet, witchgrass and volunteer corn | 0.324 - 0.405 | 0.324 - 0.405 |
| wild oats | 0.57 - 0.65 | 0.57 - 0.65 |
| volunteer wheat and oats | 0.65 | 0.57 - 0.65 |
| volunteer barley | 0.65 - 0.77 | 0.57 - 0.65 |
| quackgrass suppression | 1.78 | 1.10 |

Where a rate range is specified for a weed, use the higher rate to control heavy infestations. Apply Poast with Assist Oil Concentrate or Merge at 1 L/100 L spray solution in 25 to 45 L/acre water. The use of Merge will provide more consistent annual grass control than Assist. Apply with stainless steel 80° flat fan nozzles and use 40 to 45 psi (275 to 300 kPa) pressure. If weed infestations or crop canopy is dense, use 45 to 80 L/acre of water and 45 psi (300 kPa) pressure. Apply when the majority of annual grassy weeds are in the 2 to 5 leaf stage. Control may be reduced if grasses are not actively growing due to drought, flooding or prolonged cool periods (15 °C or less). Do not use flood jet or hollow cone nozzles. Apply no later than 80 days prior to harvest. For aerial recommendations see *Aerial Application* section. Allow 4 days between application of Poast and any other chemicals. For suppression of quackgrass, rhizomes must be thoroughly fragmented by spring tillage prior to seeding. Apply Poast at the 1 to 3 leaf stage of the quackgrass in 45 to 80 L/acre water with Assist Oil Concentrate or Merge at 2 L/100 L spray solution. Control will be enhanced by inter-row cultivation but do not cultivate sooner than 7 days after application. Poor results will occur if the quackgrass is not actively growing at the time of treatment. Do not seed cereals, forage grasses, corn or other sensitive crops into Poast treated fields for at least 14 days following Poast application. A cultivation to a 4 inch (10 cm) depth is required 7 days prior to reseeding Poast treated fields to grass crops (such as corn, cereals or forage grasses) in the year of treatment.

***Poast + Power Pack*** Controls volunteer cereals and suppresses top growth of quackgrass, at reduced rates of Poast. For annual grass control, apply when the majority of weeds are in the 2 to 5 leaf stage. Apply 0.57 L/acre Poast with 1.62 L/acre Ammonium Sulphate and Assist Oil Concentrate at 1 L/100 L spray solution in 25 to 45 L/acre water. For heavy infestations or if the crop canopy is heavy, use Assist Oil Concentrate at 2 L/100 L spray solution in 80 L/acre water. To mix, partially fill the tank with water. While the agitation runs, add the Ammonium Sulphate to the tank first, then add the correct amount of Poast. Lastly, add the Assist Oil Concentrate and continue filling with water.

For quackgrass suppression, ensure that rhizomes are thoroughly fragmented by spring tillage prior to seeding. Apply 1.1 L/acre Poast with 1.62 L/acre Ammonium Sulphate and Assist Oil Concentrate at 1 to 2 L/100 L spray solution in 45 to 60 L/acre water at the 1 to 3 leaf stage of quackgrass. Control will be enhanced by inter-row cultivation but do not cultivate sooner than 7 days after application.

Spray with 80° flat fan nozzles at pressures of 40 to 45 psi (275 to 300 kPa). Do not use flood jet or hollow cone nozzles. Control may be reduced if grasses are under stress due to drought, flooding or prolonged cool weather (15 °C or less). Apply no later than 80 days prior to harvest. Allow 4 days between Poast and application of any other chemicals. Do not seed cereals, forage grasses, corn or other sensitive crops into Poast treated fields for at least 14 days following Poast application. A cultivation to a 4 inch (10 cm) depth is required 7 days prior to reseeding Poast treated fields to grass crops (such as corn, cereals or forage grasses) in the year of treatment.

*Ammonium Sulphate is corrosive to metal. Thoroughly clean the sprayer after use of Poast plus Power Pack. Do not let mixture stand in the tank for lengthy periods of time.*

***Sencor 500 F (500 g/L), Sencor 75 DF (75%)*** Controls several broadleaf weeds. See Table 18. Apply 0.222 L/acre Sencor 500 F or 0.151 kg/acre Sencor 75 DF in 45 to 120 L/acre water. Apply early postemergence soon after potatoes emerge and before weeds are 1.6 inches (4 cm) high. Do not use on the varieties Shepody, Belleisle and Tobique. Do not use postemergence treatments on red skinned or on early maturing varieties. Do not apply within 60 days of harvest.

## *Rutabagas*

### Stale Seedbed

See *Stale Seedbed Weed Control* at the beginning of the Horticulture section.

### Preplant Incorporated
### (Six to 10 days Before Planting)

***Eptam 8-E (800 g/L)*** Controls annual grasses and several broadleaf weeds (Table 18). Apply 1.32 to 1.72 L/acre in at least 45 L/acre water. Eptam must be applied to a dry soil surface of a well prepared seedbed. See *Herbicide Incorporation* section for information on incorporation.

*If dry weather prevails at the time of application, do not use Eptam on sand and use the lower rate on medium and heavy soils. The level of weed control will be reduced when Eptam is used on soils which have been treated with Eptam, Eradicane or Sutan the previous growing season. It is anticipated that the reduction in control will be greater where these herbicides have been used repeatedly for two or more years.*

***Rival (500 g/L), Treflan EC (545 g/L)*** Controls green and yellow foxtail, wild oats, and several broadleaf weeds. (Table 18) Spring application only. Apply 0.65 to 1.13 L/acre Rival or 0.61 to 0.81 L/acre Treflan EC in at least 45 L/acre water. Refer to *Herbicide Incorporation* section for application and incorporation instructions. Rival and Treflan leave a residue in the soil which may affect subsequent crops. See *Table 24* for a list of susceptible species. **Trifluralin-resistant green foxtail has developed in Manitoba. Rival and Treflan will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

## *Tomatoes (Transplanted)*

### Preplant Incorporated

***Devrinol 50-WP (50%)*** Controls several annual grasses and broadleaf weeds (Table 18). Does not control established weeds. Apply 0.91 to 1.82 kg/acre. Use the lower rate on light soils (coarse textured – sandy and sandy-loam). On flat-planted or bedded crops apply before planting to well-worked soil that is dry enough to permit thorough incorporation to a depth of 1 to 2 inches (2.5 to 5 cm). Incorporate the same day as applied, using equipment which will result in uniform incorporation of the herbicide to the desired depth.

Many crops are sensitive to Devrinol residues in the soil. To avoid injury to crops (except those specified on the label) do not plant until 12 months after the last Devrinol 50-WP application. Do not apply more than once per season. Spraying on ground heavily covered with leaves or trash may adversely affect weed control. Do not use on soils with over 10% organic matter.

***Rival (500 g/L), Treflan EC (545 g/L)*** Controls green and yellow foxtail, wild oats, and several broadleaf weeds (Table 18). **Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Rival and Treflan will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.** Spring application only. Apply 0.65 to 1.13 L/acre Rival or 0.61 to 0.81 L/acre Treflan EC in at least 45 L/acre water. Refer to *Herbicide Incorporation* section for application and incorporation instructions. Rival and Treflan leave a residue in the soil which may affect subsequent crops. See *Table 24* for a list of susceptible species.

### Postemergence

***Fusilade (250 g/L)*** Controls several grassy weeds. See Table 18. Apply the rate appropriate for the weeds to be controlled according to the following table.

| WEED | LEAF STAGE | RATE (L/acre) |
|---|---|---|
| volunteer corn | 2 - 5 | 0.243 |
| barnyard grass, volunteer wheat, volunteer barley | 2 - 4 | 0.324 |
| wild oats, proso millet | 2 - 4 | 0.405 |
| green and yellow foxtail | 2 - 4 | 0.57 |
| quackgrass suppression | 3 - 5 | 0.81 |

Apply at the recommended leaf stage in 45 to 120 L/acre of water using flat fan nozzles and a pressure of 30 to 40 psi (200 to 275 kPa). Add Agral 90 at a rate of 0.1 L/100 L of spray solution. Do not apply after tillering of annual grass weeds. For quackgrass suppression in annual crops ensure that rhizomes are thoroughly fragmented by spring tillage prior to seeding. Quackgrass plants more than 8 inches (20 cm) in height or which have reached the heading stage will not be controlled. Fusilade effectiveness will be reduced when plants are stressed by lack of moisture, excess moisture, flooding, low temperatures or very low relative humidity. Do not apply if rainfall is expected within 2 hours of application. Do not tank mix with other herbicides or fertilizers. Other herbicides must be applied at least 3 days after Fusilade. Do not reseed sensitive crops within 60 days of application. Avoid drift onto sensitive crops (corn, cereals, forage grasses and turf). Do not graze or feed treated crops during the year of treatment. Do not apply by air. Do not apply within 60 days of harvest.

Experimental feeding studies have demonstrated that the active ingredient in this product can produce birth defects and other adverse effects in the developing fetus of rats. Women capable of bearing children should be particularly careful when handling this product. Occupational exposure to this product will be reduced by strict adherence to the handling precautions and use directions provided on the product label.

***Poast (184 g/L)*** Controls several grassy weeds (Table 18).

Apply:

| WEED | RATE (L/acre) With Assist | RATE (L/acre) With Merge |
|---|---|---|
| green or yellow foxtail, barnyard grass, proso millet, witchgrass and volunteer corn | 0.324 - 0.405 | 0.324 - 0.405 |
| wild oats | 0.57 - 0.65 | 0.57 - 0.65 |
| volunteer wheat and oats | 0.65 | 0.57 - 0.65 |
| volunteer barley | 0.65 - 0.77 | 0.57 - 0.65 |
| quackgrass suppression | 1.78 | 1.10 |

Where a rate range is specified for a weed, use the higher rate to control heavy infestations.

Apply Poast with Assist Oil Concentrate or Merge at 1 L/100 L spray solution in 25 to 45 L/acre water using stainless steel 80° flat fan nozzles at 40 to 45 psi (275 to 300 kPa) pressure. The use of Merge will provide more consistent annual grass control than Assist. Do not use flood jet or hollow cone nozzles. If weed infestations or crop canopy is dense, use 80 L/acre of water and 45 psi (300 kPa) pressure. Apply when the majority of annual grassy weeds are in the 2 to 5 leaf stage. Control may be reduced if grasses are not actively growing due to drought, flooding or prolonged cool periods (15°C or less).

For suppression of quackgrass, rhizomes should be thoroughly fragmented by spring tillage prior to seeding. Apply Poast at the 1 to 3 leaf stage of the quackgrass in 45 to 80 L/acre of water with Assist Oil Concentrate or Merge at 2 L/100 L spray solution. Control will be enhanced by inter-row cultivation but do not cultivate sooner than 7 days after application. Poor results will occur if the quackgrass is not actively growing at the time of treatment. Apply no later than 60 days prior to harvest. Allow at least 4 days between application of Poast and application of other chemicals. Do not seed cereals, forage grasses or corn into Poast treated fields for at least 14 days following Poast application. A cultivation to a 4 inch (10 cm) depth is required 7 days prior to reseeding Poast treated fields to grass crops (such as corn, cereals or forage grasses) in the year of treatment.

***Poast + Power Pack*** Controls volunteer cereals at reduced rates of Poast as well as annual grasses including green and yellow foxtail, barnyard grass and wild oats. Apply 0.57 L/acre Poast with 1.62 L/acre Ammonium Sulphate and Assist Oil Concentrate at 1 L/100 L spray solution in 25 to 45 L/acre water when the majority of annual grasses are in the 2 to 5 leaf stage. For heavy infestations use 80 L/acre water. To mix, partially fill the tank with water. While the agitation runs, add the Ammonium Sulphate to the tank first, then add the correct amount of Poast. Lastly, add the Assist and continue filling with water. Use 80° flat fan nozzles and pressures of 40 to 45 psi (275 to 300 kPa). Do not use flood jet or hollow cone nozzles. Reduced control may occur if grasses are stressed due to flooding, drought or prolonged cool conditions (15° C or lower). Apply no later than 60 days prior to harvest. Allow at least four days between application of Poast and other chemicals. Do not seed cereals, forage grasses or corn into Poast treated fields for at least 14 days following Poast application. A cultivation to a 4 inch (10 cm) depth is required 7 days prior to reseeding Poast treated fields to grass crops (such as corn, cereals or forage grasses) in the year of treatment. *Ammonium Sulphate is corrosive to metal. Thoroughly clean the sprayer after use of Poast + Power Pack. Do not let this mixture stand in the tank for lengthy periods of time.*

# Fruits

## *Raspberries*

**NOTE:** *The following treatments are recommended as directed sprays to established plantings only.*

### *Preemergent to Weeds*

***Casoron 4G (4%)*** Controls annual and perennial grasses and broadleaf weeds (Table 18). Apply 44.5 to 70.8 kg/acre product in the fall. Use the lower rate on lighter soils. Avoid use on light sandy soil. Use the lower rate if treatment is followed by rain or irrigation. Do not apply in spring as injury can occur. Do not cultivate or work into soil.

***Devrinol 50-WP (50%)*** Controls several annual grasses and broadleaf weeds (Table 18). Does not control established weeds. Apply 3.64 kg/acre in 80 to 360 L/acre of water in the fall or early spring prior to weed emergence. Sprinkler irrigation of 0.5 inches (12 mm) or light incorporation of about 2 inches (5 cm) of the herbicide into the soil by cultivation may be required if rain does not occur within 7 days of application. Use as a directed spray and avoid contact with fruit or foliage.

On new plantings application may be made immediately after transplanting. Injury may occur in situations where heavy rain or too deep incorporation carries the herbicide to the plant's entire root system.

Spraying on ground heavily covered with leaves or trash may reduce weed control. Do not spray on frozen ground. Do not use on soils with over 10% organic matter.

Many crops are sensitive to Devrinol residues in the soil. To avoid injury to crops (except those specified on the label) do not plant until 12 months after the last Devrinol application.

***Princep Nine-T (90%), Simadex 80 W (80%), Simazine 80 W (80%)*** Controls annual grasses and several broadleaf weeds (Table 18). Apply 0.81 to 1.01 kg/acre product Princep Nine-T or 0.91 to 1.11 kg/acre Simadex 80 W or Simazine 80 W in 120 L/acre water at base of canes in early spring. Do not spray young shoots. Avoid excessive wetting of raspberries.

Princep Nine-T, Simadex 80 W and Simazine 80 W are residual herbicides. Do not plant any other crop in the year of application except corn. Do not exceed recommended rates or overlap as injury may result to succeeding crops. Extended periods of dry weather during the year of treatment will cause increased carryover which can cause injury to succeeding crops such as white beans, onions, peas, tomatoes and turnips.

### Postemergent to Weeds

***Gramoxone (200 g/L)*** Controls annual grasses, broadleaf weeds and top growth of perennial weeds. Apply 2.2 L/acre in 120 to 220 L/acre water or 75 mL in 10 L water per 1076 square feet (100 square metres). Direct spray near base of canes early in spring before new raspberry shoots emerge. Spray until leaves of weeds are wet. Do not spray past run-off.

***2,4-D*** Controls several broadleaf weeds (Table 18). Apply 0.57 L/acre of formulations containing 500 g/L 2,4-D amine in 40 to 90 L/acre water. For product volumes of other 2,4-D amine formulations refer to Table 21. Application may be made at any time throughout the growing season when weeds are growing actively except when raspberries are in blossom. Care should be taken to keep the chemical off new shoots as much as possible.

## *Strawberries*

### Preemergent to Weeds

***Dacthal W-75 (75%)*** Controls several annual grasses and broadleaf weeds (Table 18). Does not control established weeds.

*At Transplanting*

Apply 5.46 kg/acre in at least 90 L/acre of water, uniformly to the soil surface. Can be preplant incorporated. Do not incorporate deeper than 2 inches (5 cm). Shallow incorporation gives more consistent results. To incorporate use a disc harrow or related tillage equipment. To ensure complete incorporation, double disc in two directions.

*Established Planting*

Apply 3.65 to 5.46 kg/acre in at least 90 L/acre of water in fall or early spring. Do not apply from first bloom through harvest. Application may be made directly over the plants.

To ensure uniform suspension in the spray tank, Dacthal should be pre-mixed in a clean container at the rate of almost 5.5 kg to 15 litres of water. This should be stirred until a slurry is formed and then added to the spray tank during or after filling. Adequate agitation should be maintained during filling and spraying to keep material in uniform suspension. Use nozzles suitable for applying wettable powder and screens and filters should be 50 mesh or larger.

A minimum of 0.5 inches (1.25 cm) of water either as rain or irrigation is necessary to activate Dacthal and thereby obtain pre-emergence control of weeds. Water must be applied within 3 days of application if sufficient rain does not occur. However, if surface is dry but subsurface soil contains enough moisture to germinate weeds, water should be applied immediately.

Replanting crops other than those included on the label, in Dacthal-treated soil within 8 months of application may result in crop injury. If replanting is required, because of an early crop failure, the planting of onions, seeded melons, potatoes, tomatoes, eggplants or peppers at this time may result in crop injury. However, all crops on the label may be planted following harvest of a Dacthal-treated crop.

***Devrinol 50-WP (50%)*** Controls several annual grasses and broadleaf weeds (Table 18). Does not control established weeds. Apply 3.64 kg/acre in 80 to 360 L/acre of water in the fall or early spring prior to weed emergence. Do not apply to frozen ground.

Sprinkler irrigation of 0.5 inches (1.2 cm) or light incorporation to a depth of 2 inches (5 cm) may be required if natural precipitation does not occur within 7 days of application. Use as a directed spray and avoid contact with foliage. Do not apply from bloom to harvest.

Application to newly planted strawberries should be delayed until the desired number of daughter plants have become established.

Injury may occur in situations where heavy rain or too deep incorporation carries the herbicide to the plant's entire root system.

Many crops are sensitive to Devrinol residues in the soil. To avoid injury to crops (except those specified on the label) do not plant until 12 months after the last Devrinol application.

Spraying on ground heavily covered with leaves or trash may reduce weed control. Do not use on soils with over 10% organic matter.

***Rival (500 g/L), Treflan EC (545 g/L)*** *Spring application only.* Controls green and yellow foxtail and several broadleaf weeds. (*Table 18*). **Caution: Trifluralin-resistant green foxtail has developed in Manitoba. Rival and Treflan will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.** Apply prior to planting transplanted strawberries.

| PRODUCT | SOIL TYPE | |
|---|---|---|
| | Light Soils with 2 - 6% organic matter | Medium to Heavy Soils 6 - 15% organic matter |
| Rival | 0.65 L/acre | 0.89 L/acre |
| Treflan EC | 0.61 L/acre | 0.81 L/acre |

Apply in at least 45 L/acre water as a spring preplant application. *See the Herbicide Information section* for application and incorporation instructions. Do not exceed the maximum application rate as over-application may delay establishment of runner plants. These herbicides leave a residue in the soil which may affect subsequent crops. *See Table 24* for a list of susceptible crops.

***Sinbar (80%)*** Controls annual grasses and broadleaf weeds (Table 18).

*New plantings*

Apply 0.141 to 0.214 kg/acre product. Apply after mother plants are well established but before new runner plants start to root (usually 4 to 6 weeks after planting).

*After renovation on established stands*

Apply 0.141 to 0.214 kg/acre product after renovation and follow with a second application before mulching.

*Before mulching in fall*

Apply 0.283 to 0.405 kg/acre product in not less than 130 L/acre water.

Use the lower of the recommended rates on sandy soil with low organic matter and on sensitive varieties such as Earlidawn, Midway, Bounty, Micmac and Sparkle. Temporary foliage injury may occur after application. *Use only on healthy, vigorous plants.* Weak, diseased or injured plants are subject to serious injury. Risk of strawberry plant injury is reduced if 0.6 to 1.2 inches (1.5 to 3 cm) of rain or irrigation follows immediately after application. Sinbar must be applied accurately within recommended application rates.

Growers using Sinbar for the first time, or growers changing production practices should treat only a limited area until experience is gained with Sinbar. Do not replant treated areas to any crop within two years after the last application as injury to subsequent crops may occur. To reduce replanting injury to subsequent crops, cultivate or plough soil thoroughly.

## Postemergence

***Enide (50%)*** Controls volunteer grains, barnyard grass and green and yellow foxtail (Table 18). Apply 3.64 to 5.46 kg/acre product in at least 180 L/acre water. Apply immediately before mulching in late fall. Enide does not leave a residue in the soil the following year. It may be considered to reduce restrictions on subsequent crops.

***Fusilade (250 g/L)*** Controls several grassy weeds. See Table 18. Apply the rate appropriate for the weeds to be controlled according to the following table.

| WEED | LEAF STAGE | RATE (L/acre) |
|---|---|---|
| volunteer corn | 2 - 5 | 0.243 |
| barnyard grass, volunteer wheat, volunteer barley | 2 - 4 | 0.324 |
| wild oats, proso millet | 2 - 4 | 0.405 |
| green and yellow foxtail | 2 - 4 | 0.57 |
| quackgrass suppression | 3 - 5 | 0.81 |

Apply at the recommended leaf stage in 45 to 120 L/acre of water using flat fan nozzles and a pressure of 30 to 40 psi (200 to 275 kPa). Add Agral 90 at a rate of 0.1 L/100 L of spray solution. Do not apply after tillering of annual grass weeds. For quackgrass suppression in the year of establishment ensure that rhizomes are thoroughly fragmented by spring tillage prior to planting. Quackgrass plants more than 8 inches (20 cm) in height or which have reached the heading stage will not be controlled. Use only one application per year. Do not apply within 30 days of harvest. Treat in the spring before bloom or after renovation. Fusilade effectiveness will be reduced when plants are stressed by lack of moisture, excess moisture, flooding, low temperatures or very low relative humidity. Do not apply if rainfall is expected within 2 hours of application. Do not tank mix with other herbicides or fertilizers. Other herbicides must be applied at least 3 days after Fusilade. Do not reseed sensitive crops within 60 days of application. Avoid drift onto sensitive crops (corn, cereals, forage grasses and turf). Do not apply by air.

Experimental feeding studies have demonstrated that the active ingredient in this product can produce birth defects and other adverse effects in the developing fetus of rats. Women capable of bearing children should be particularly careful when handling this product. Occupational exposure to this product will be reduced by strict adherence to the handling precautions and use directions provided on the product label.

***Lontrel (200 g/L)*** Controls tufted vetch, goldenrod and Canada thistle and will provide suppression of sheep sorrel and ox-eye daisy. Apply 0.405 to 0.61 L/acre Lontrel in 60 to 100 L/acre water immediately after harvest at renovation or prior to mulching in October/November, when annual weeds are in the 2 to 4 leaf stage and Canada thistle is in the rosette to pre-bud stage. Application to Canada thistle after flowering has initiated will not provide satisfactory control. Poor control may occur if dry soil conditions prevail. Rainfall within 6 hours of application will reduce control. Do not apply within 200 days of harvest. Lontrel leaves a residue in the soil, seed only to wheat, oats, barley, rye, flax, rapeseed or summerfallow the year after treatment. For additional recropping information refer to *Table 24*.

***Tenoran (50%)*** Controls several broadleaf weeds (Table 18). Apply 3.64 to 4.45 kg/acre product in 120 to 200 L/acre water. Apply when weeds are less than 1 to 2 inches (2.5 to 5 cm) tall.

Irrigate immediately after application or apply just before or during a rain. Control should be effective for 3 to 6 weeks, after which Tenoran can be reapplied to newly emerged weeds. In the year of establishment, do not apply for 4 to 5 weeks after transplanting. In the bearing years, do not apply until after harvest.

# Parks and Golf Courses

**Provincial Pesticide Use Permits are required prior to applying herbicides to golf courses.**

Use permit applications may be obtained from the Environmental Control Branch of the Department of Environment and Workplace Safety and Health.

A sound management program on turf that promotes vigorous growth of grass helps to control weeds. Fertilizing, watering and cutting at the proper height should be included. The application of herbicides may be required to obtain weed-free turf. Two herbicide applications are recommended for satisfactory control. The first, prior to May 31, controls 2,4-D susceptible species such as dandelions and the second with a herbicide mixture controls the hard-to-kill weeds such as chickweed, clover, and creeping Charlie.

Care should be taken in the application of herbicides to prevent drift onto susceptible flowers, shrubs and trees. Precautions include the use of low-pressure or no-pressure applicators and application on non-windy days only.

***Banvel (480 g/L)*** Controls clover, mouse-eared chickweed and erect knotweed. Apply 0.51 L/acre in 45 L/acre water. A tank mix of Banvel at 0.51 L/acre plus 2,4-D amine at 0.445 to 0.89 L/acre of formulations containing 500 g/L 2,4-D is effective against dandelion and plantain. For product volumes of other 2,4-D amine formulations, see *Table 21*. Apply to newly seeded grasses only after second mowing. Do not apply to bent grass. Do not apply closer than the drip line of trees and shrubs. Do not rake, mow or water lawn within 24 hours after application.

***Betasan (480 g/L or 12.5% granular)*** Controls annual bluegrass. Apply 610 mL in 60 to 120 L water to 2152 square feet (200 square metres) or 1.35 kg granular product to 1076 square feet (100 square metres). May be used on bent grass species.

***Compitox (150 g/L)*** Controls chickweed, ground ivy (creeping Charlie), knotweed, clover, black medick and other 2,4-D resistant weeds. Apply 4.45 L/acre in 120 to 160 L/acre water. May be used on bent grass species.

***Compitox Plus (200 g/L)*** Controls chickweed, ground ivy (creeping Charlie), knotweed, clover, black medick and other 2,4-D resistant weeds. Apply 3.40 L/acre in at least 90 L/acre water.

***Co-op Premium Turf Herbicide (250 g/L)*** Controls clover, chickweed, dandelions, plantain, knotweed, black medick, ground ivy (creeping Charlie). On established turf, apply 90 mL in 10 L water to 1076 square feet (100 square metres) or 3.14 to 3.44 L/acre in 120 L/acre water. Treat when weeds are growing actively and temperature is not over 30° C in late May or early June, or during late August or early September. For an extensive infestation of ground ivy, treat in June and September for two seasons. For knotweed, apply in May or June. On bent grass, only apply as a spot treatment. Bent grass around the weed may be injured.

***Killex (318 g/L)*** Controls chickweed, ground ivy (creeping Charlie), knotweed, clover, black medick and other 2,4-D resistant weeds. Apply 2.23 L/acre in at least 90 L/acre water. May be used on bent grass species at the rate of 30 mL in 20 L water applied to 1076 square feet (100 square metres). Do not apply to newly seeded turf until after the second or third mowing. Do not water within 24 hours after application.

***Mecoprop + 2,4-D (200 g/L)*** Controls chickweed, ground ivy (creeping Charlie), knotweed, clover, black medick, and other 2,4-D resistant weeds. Apply 1.8 L/acre of Mecoprop + 2,4-D in at least 90 L/acre water when the weeds are young and actively growing. Do not use on greens, seedling grasses or pure stands of bentgrasses. Avoid spraying in very hot (over 29° C) drought or rainy conditions. Do not water for 24 hours after application.

***Mecoturf (150 g/L), Mecoturf Plus 2,4-D (400 g/L)*** Controls chickweed, ground ivy (creeping Charlie), knotweed, clover, black medick, and other 2,4-D resistant weeds. Apply 2.23 to 3.44 L/acre Mecoturf or 1.72 to 2.23 L/acre Mecoturf Plus 2,4-D in at least 90 L/acre water. Mecoturf can be applied to bent grass species if temperature is below 27° C. Do not apply Mecoturf Plus 2,4-D to bent grass species.

***MCPA amine or MCPA mixtures of sodium and potassium salts or 2,4-D amine*** Controls dandelions, plantain and perennial thistles. Apply 1.21 L/acre of formulations containing 500 g/L MCPA or 2,4-D in 45 L/acre water. For product volumes of various 2,4-D and MCPA formulations refer to *Table 21*. Do not apply 2,4-D on bent grass species.

***Par III (308 g/L)*** Controls dandelion, plantain, chickweed, clover, ground ivy (creeping Charlie), knotweed, ragweed, shepherd's purse, English daisy, buttercup.

*Turf (other than bentgrass)*

Apply 2.23 L/acre in at least 100 L/acre water. Apply in spring or early fall when weeds are actively growing. Do not apply during long excessively hot or dry periods unless irrigation is possible. Do not irrigate within 24 hours of application. Do not apply to newly seeded turf until after the second or third mowing. Grass can be safely sown 1 to 2 weeks after application at recommended rates.

*Bentgrass Turf*

Apply at the rate of 30 mL in 20 L water to 1076 square feet (100 square meters). Apply in May or mid-August through September. Slight turf yellowing should disappear after about one week.

**Note:** *Care must be taken to avoid overdosing bentgrasses. Over application will result in subsequent turf discoloration or injury. Do not apply during long excessively hot or dry periods unless irrigation is available. Do not irrigate within 24 hours of application. Do not apply to newly seeded turf until after the second or third mowing.*

***Propaturf (700 g/L)*** Controls black medick, ground ivy (creeping Charlie), round-leaved mallow, stinkweed and other 2,4-D resistant weeds. Apply 1.42 L/acre in at least 90 L/acre water. Do not apply to bent grass species.

***2,4-D*** see MCPA.

# Turf Renovation

***Laredo (356 g/L), Roundup (356 g/L), Wrangler (356 g/L)*** Controls perennial grasses and broadleaf weeds. Apply 1.92 to 2.83 L/acre in 45 L/acre water when broadleaf weeds are in the bud to bloom stage and when grassy weeds are at least 8 to 10 inches (20 to 25 cm) tall. For specific application rates refer to the *Perennial Weed Control on Cropland* section or the *Special Weed Problems* section. Allow at least 5 days after application before tillage to allow for movement of the chemical to the roots. Heavy rainfall within 2 hours after application may wash the chemical off the foliage and a repeat treatment may be required. Rainfall occuring within 6 hours after application may reduce effectiveness.

**NOTE: All vegetation in the treated area will be destroyed.**

# Non-Crop Weed Control

**Provincial pesticide use permits are required prior to applying herbicides to any body of water not wholly contained within the applicator's own property.** Permit applications may be obtained from the Environmental Control Branch of the Department of Environment and Workplace Safety and Health.

## Aquatic Weeds (Agricultural)

### *Farm Ponds and Dugouts*

***Aquashade (26%)*** Controls filamentous algae and certain other aquatic weeds. Apply 750 mL of Aquashade per 1,000,000 L of water. Do not use in water where loss of dye can occur by water exchange or overflow. *Do not apply to water that will be used for drinking or other domestic purposes.*

Make the first treatment early in the growing season before algae and weed growth develops. Mechanical removal of heavy vegetation is recommended before applying Aquashade if fish are present in the pond.

***Cutrine-Plus (3.7% granular)*** Controls algae and aquatic weeds such as chara.

*Not for use in potable (drinking water) systems.*

For use in water wholly confined within the property of the user and where there is no outflow beyond the property limits.

For large areas apply at the rate of 13.59 kg/acre, and distribute evenly over the water surface directly over the vegetation to be treated. For spot treatment apply directly over the infested area at the rate of 6.70 g/10 sq. ft (1 square metre). Heavy growth may require retreatment.

Chara should be treated early in the season. As the season progresses chara becomes resistant.

To avoid suffocation to fish due to a lack of oxygen caused by decaying vegetation, never treat more than 1/3 of the pond at a time. Allow sufficient time between treatments for oxygen levels to recover (usually one to two weeks). Begin treatment along shore and proceed outwards in bands to allow fish to move into untreated areas.

**CAUTION:** *Cutrine-Plus may be toxic to trout and other fish species. Fish toxicity is dependent upon the hardness of water. (See label for additional precautions and application instructions.)*

***Cutrine-Plus (9% Liquid)*** Controls algae and aquatic weeds such as chara.

*Not for use in potable (drinking water) systems.* For use in water wholly confined within the property of the user and where there is no outflow beyond the property limits.

Apply as a surface spray using the amounts of Cutrine-Plus shown in the accompanying dilution chart. Dilute with at least nine parts of water and apply with hand or power sprayer for best distribution of the diluted Cutrine-Plus solution. Break up floating algae mats before spraying.

Apply when algae growth becomes visible and water temperature is above 15°C. If fish are present treat shoreline areas first so fish will not be trapped in shallow inlets. Best algae control is obtained under calm and sunny conditions.

Free floating algae such as Microcystis, Oscillatoria, Anaboena, Aphanizomenon are controlled with 0.2 ppm copper from Cutrine-Plus. Chara requires 0.4 ppm copper from Cutrine-Plus.

DILUTION CHART

| Average Water Depth | L of Cutrine-Plus/acre | |
|---|---|---|
| | 0.2 ppm Cu (Algae) | 0.4 ppm Cu (Chara) |
| 0.5 m | 3.73 | 7.45 |
| 1.0 m | 7.45 | 14.91 |
| 1.5 m | 11.18 | 22.36 |

*Dilute above rates at least nine to one before applying.*

To avoid suffocation to fish due to a lack of oxygen caused by decaying vegetation, never treat more than 1/3 of the pond at a time. Allow sufficient time between treatments for oxygen levels to recover (usually one to two weeks). Begin treatment along shore and proceed outwards in bands to allow fish to move into untreated areas.

**CAUTION:** *Cutrine-Plus may be toxic to trout and other fish species. Fish toxicity is dependent upon the hardness of water. (See label for additional precautions and application instructions.)*

***Karmex (80%)*** Controls algae and aquatic weeds such as pondweed and chara. Apply as a spray early in spring in a minimum of 180 L/acre spray solution. Use the lower range of rates for algae control and the higher range of rates for aquatic weeds and extended algae control. Use only in ponds with little or no water flow through.

For a dugout 69 x 200 x 3 feet deep (21 x 61 x 1 m deep), apply 0.8 to 1.6 kg Karmex for algae control. For submergent aquatics and extended algae control apply 2.4 to 3.2 kg Karmex. For deeper water, increase rate proportionally.

Do not use in domestic water supply. Do not use treated water for irrigation within one year of treatment. Do not use if desirable trees or shrubs have roots extending to the water. If Karmex is to be used in farm ponds or dugouts a supplement to the label must be obtained from your chemical dealer as the required information is not on the container label.

***Princep Nine-T (90%), Simazine 80 WP (80%), Simmaprim (80%)*** Controls filamentous algae, submerged aquatics and chara. If filamentous algae is present, apply 5.0 g product of Princep Nine-T or 6.0 g product of Simazine 80 WP or Simmaprim to 10,000 L water. If submerged aquatics are present, apply 10 g product of Princep Nine-T or 12 g product of Simazine 80 WP or Simmaprim to 10,000 L water. For chara control, apply 20 g product of Princep Nine-T or 24 g product of Simazine 80 WP or Simmaprim, in 10,000 L water.

For a dugout 69 x 200 x 13 ft (21 x 61 x 4 m) which contains approximately 3,000,000 L when full, apply 1.5 kg product of Princep Nine-T or 1.8 kg product of Simazine 80 WP or Simmaprim to control filamentous algae. If submerged aquatics are present, apply 3.0 kg product of Princep Nine-T or 3.6 kg product of Simazine 80 WP or Simmaprim. For chara control, apply 6.0 kg product of Princep Nine-T or 7.2 kg product of Simazine 80 WP or Simmaprim.

Although Princep Nine-T, Simazine 80 WP or Simmaprim are low in toxicity to mammals, no tolerance levels have been established for fish. Therefore, fish taken from the treated ponds should not be used for human consumption.

**NOTE: Use Princep Nine-T, Simazine 80 WP or Simmaprim early in the season before dense growths of algae or submergent vegetation are present. This is necessary for more effective control and because of possible hazard to fish from oxygen depletion as plants decompose. Algicides are not effective for partial treatments in large ponds where there is a significant flow through at the time of treatment and for about 10 days following. Treated water that contacts grass and other vegetation may cause damage. Avoid using where willow or valuable trees or shrubs are growing along the margins of the pond. Water treated with these products can be used for animal consumption. Do not use water for irrigation or human consumption for one year.**

***Reglone A (200 g/L)*** Controls duckweed, coontail, Canada water weed, pondweed and water milfoil. For a dugout 63 x 183 ft (21 x 61 m), but less than 5 ft (1.5 m) deep apply 2.82 L. If over 5 ft (1.5 m) deep, apply 3.8 to 4.5 L. Apply early in season just after weeds begin active growth. Apply as overall spray. If duckweed is not present, application may be by injection. Avoid use of water for human and animal consumption for 24 hours after application. Do not use water for irrigation for five days after application. Repeat treatment if regrowth occurs.

***Simazine 80 WP*** see Princep Nine-T.

***Simmaprim*** see Princep Nine-T.

## Ditches

See Note A under *Aquatic Weeds (non agricultural).*

## Drainage Ditches

***Gramoxone S (200 g/L) plus Reglone A (200 g/L)*** Controls coontail, duckweed, Canada water weed, pond weeds and water milfoil. Apply 2.23 L/surface acre Gramoxone S plus 2.23 L/surface acre Reglone A to water no deeper than 2.5 ft (0.75 m). For water deeper than 2.5 ft (0.75 m), apply 4.45 L/surface acre Gramoxone S and 4.45 L/surface acre Reglone A. Consult label for directions on injection and timing.

***Princep Nine-T (90%), Simazine 80 WP (80%), Simmaprim (80%)*** Controls rooted aquatic weeds and most annuals. Apply 9.71 kg/acre product of Princep Nine-T or 11.13 kg/acre product of Simazine 80 WP or 10.12 kg/acre product of Simmaprim in 200 to 810 L/acre water. Apply to soil surface when area is dry. Discing after application assists in controlling deeply rooted weeds. Where discing cannot be done, water should not be introduced to the treated area until sufficient rainfall has carried the herbicide into the soil.

**Caution:** *Do not apply where roots of desirable vegetation can extend into the treated area.*

## Irrigation and Drainage Ditches

**Karmex (80%)** Controls coontail, duckweed, Canada waterweed, pond weeds and water milfoil. Apply 9.31 to 27.1 kg/acre product in 120 L/acre water. For irrigation ditches, apply during the non-crop season and when ditch is not in use. To minimize the movement of Karmex with irrigation water and avoid possible crop injury, the herbicide must be fixed in the soil by moisture.

Apply before expected seasonal rainfall (if possible, when soil in ditch is moist). Following treatment, if rainfall has not totalled at least four inches (10 cm) fill the ditch with water and allow to stand for 72 hours. Drain off waste water remaining before using ditch. Do not treat any ditch into which roots of trees or other desirable plants may extend as injury will result.

## Emerged Aquatics

***Amitrol-T (200 g/L)*** Controls cattails. Use 22.3 L/acre in at least 405 L/acre water. Apply after cattails are fully formed and up to frost. Wet plants thoroughly. Do not apply where water will be used for irrigation, drinking or other domestic purposes. Do not apply where water is not wholly contained within user's property.

***Gramoxone S (200 g/L)*** Controls cattails and bulrushes. Apply 2.23 to 4.45 L/acre in 120 L/acre water at the early flowering stage.

***Laredo (356 g/L), Roundup (356 g/L), Wrangler (356 g/L)*** Apply 2.83 to 4.86 L/acre in 45 L/acre water when cattails are in the mid to late flowering stage (mid-July to mid-August) and are actively growing. Heavy rainfall within 2 hours of application may wash chemical off the foliage and a repeat treatment may be required. Rainfall occuring within 6 hours after application may reduce effectiveness.

**Caution:** *Avoid direct application to any body of water. Only use this treatment when ditches are dry so no water contamination will occur.*

## Aquatic Weeds (Non-Agricultural)

**NOTE A:** *Any individual or organization intending to apply any herbicide to a body of water not totally contained within their own property must register with The Environmental Control Branch of the Department of Environment and Workplace Safety and Health.*

*Information about the area being treated, the weeds being controlled, the herbicides to be used, and other information on the use of the water should be supplied on the form provided by:*

Environmental Management Branch
Box 7, Building 2, 139 Tuxedo Blvd.,
Winnipeg, Manitoba
R3N 0H6

## *Lakes, Ponds, Canals, Irrigation and Drainage Ditches*

***Reglone A (200 g/L)*** Controls duckweed, coontail, Canada water weed, pondweeds and water milfoil. Apply 8.9 L/surface acre to water up to 5 ft (1.5 m) deep, or 12.1 to 14.2 L/surface acre to water over 5 ft (1.5 m) deep early in season just after weeds begin active growth. Apply as overall spray. If duckweed is not present, application may be by injection. Avoid use of water for human and animal consumption for 24 hours after application. Do not use water for irrigation for five days after application. Repeat treatment if regrowth occurs.

## *Drainage Ditches, Canals, Urban Ponds and Beach Areas*

***Aqua-Kleen (2,4-D 19%)*** Controls water milfoil, water stargrass. Apply 44.5 to 91 kg/acre in the spring or early summer, during the time weeds start to grow. Use the higher rates for dense weeds, when water is more than 8 feet (2.4 meters) deep and where there is a large volume turnover. If treatments are delayed until weeds form a dense mat and reach the surface the higher rate of 91 kg/acre should be used, or two applications at the lower rate of 44.5 kg/acre should be made. Make the second application when heavy regrowth occurs or if weeds move in from untreated areas. Refer to product label for details on application techniques.

**Caution:** *Do not use treated water for consumption by humans or livestock or for irrigation for 60 days after application in confined waters, and 21 days in open water. Before using for these purposes, conduct analysis to ensure that the level of 2,4-D does not exceed levels listed in the Canadian Drinking Water Standards.*

***Gramoxone S (200 g/L) plus Reglone A (200 g/L)*** Controls coontail, duckweed, Canada water weed, pondweeds and water milfoil. Apply 2.23 L/surface acre Gramoxone S plus 2.23 L/surface acre Reglone A to water up to 2.5 ft (0.75 m) deep. For deeper water apply 4.45 L/surface acre Gramoxone S and 4.45 L/surface acre Reglone A. Check label for directions on injection and timing.

***Princep Nine-T (90%), Simazine 80 WP (80%), Simmaprim (80%)*** Controls rooted aquatic weeds and most annuals. Apply 9.71 kg/acre product of Princep Nine-T or 11.13 kg/acre product of Simazine 80 WP or 10.12 kg/acre product of Simmaprim in 200 to 810 L/acre water. Apply to soil surface when area is dry. Discing after application will assist in control of deeply rooted weeds. Where discing cannot be done water should not be introduced to the treated area until sufficient rainfall has carried the herbicide into the soil.

**CAUTION:** *Do not apply where roots of desirable vegetation can extend into treated area.*

## *Emerged Aquatics*

***Gramoxone S (200 g/L)*** Controls cattails and bulrushes. Apply 2.23 to 4.45 L/acre in 120 L/acre water at the early flowering stage.

***Laredo (356 g/L), Roundup (356 g/L), Wrangler (356 g/L)*** Apply 2.83 to 4.86 L/acre in 45 L/acre water when cattails are in the mid-to-late flowering stage (mid-July to mid-August) and are actively growing. Heavy rainfall within 2 hours of application may wash chemical off the foliage and a repeat treatment may be required. Rainfall occuring within 6 hours after application may reduce effectiveness.

**Caution:** *Avoid direct applicatin to any body of water. Use this treatment only when ditches are dry so no water contamination will occur.*

# Roadside Weed Control

**Provincial pesticide use permits are required prior to applying herbicides to roadsides or public properties by government departments, crown corporations, municipal corporations, school boards or on crown lands or rights-of-way on behalf of private corporations other than farm corporations.**

Use permit applications may be obtained from the Environmental Control Branch of the Department of Environment and Workplace Safety and Health.

Several herbicides are available for roadside weed control. Applicators should be aware of the alternatives for each situation, and the limitations or concerns associated with each herbicide.

Tordon products are residual and may damage desirable vegetation if off-target movement occurs. All roadside weed control products can cause damage to adjacent sensitive vegetation if off-target drift occurs.

Select roadside weed control herbicides only after considering suitability for weed species to be controlled, restrictions on use of treated area, potential damage to adjacent areas, cost and public concern.

**NOTE:** For recommendations on roadside brush control refer to the *Brush Control* section of this Guide. For spot treatment of special weed problems on roadsides refer to the *Special Weed Problems* section of this Guide.

***Banvel (480 g/L), Dycleer (480 g/L)*** Controls several broadleaf weed species. Apply Banvel or Dycleer or the Banvel or Dycleer tank mixtures in 45 to 90 litres/acre water when weeds are actively growing. Thorough coverage of foliage is essential. For control of a broader range of weeds, the recommended rate of Banvel or Dycleer may be tank mixed with 2,4-D amine or 2,4-D LV ester. Consult the 2,4-D recommendation regarding rates of application and weed species controlled.

| Species Controlled | | Rate Per Acre |
|---|---|---|
| suppresses the top growth of:<br>absinthe<br>Canada thistle<br>perennial sow-thistle | <br>leafy spurge<br>poverty weed<br>scentless mayweed | 0.51 L |
| top growth suppression of:<br>diffuse knapweed<br>goat's beard<br>ground cherry<br>pasture sage | <br>poverty weed<br>sheep sorrel<br>thyme-leaved spurge | 1.86 L |
| controls:<br>common ragweed<br>English daisy<br>goldenrod<br>false ragweed<br>giant ragweed | <br>tansy ragwort<br>and top growth of<br>curled dock<br>perennial sow-thistle<br>Canada thistle<br>field bindweed | 0.93 L |
| control of:<br>baby's breath<br>perennial cinquefoil | <br>and top growth of:<br>Russian knapweed | 3.72 L |

SPRAY DRIFT PRECAUTIONS:

**Banvel or Dycleer herbicides may cause injury to desirable trees and plants, particularly sunflowers, soybeans, flowers, fruit trees, ornamentals, peas, potatoes and tomatoes. Do not treat areas where downward movement into the soil or surface washing may bring the herbicide into contact with the roots of desirable plants. Avoid making applications where spray may drift onto nearby sensitive crops. Do not spray near sensitive crops when winds are gusty or in excess of eight km/hour and moving towards sensitive crops. Leave an adequate buffer zone between areas to be treated and sensitive plants. Do not apply herbicide in the vicinity of sensitive crops when the temperature on the day of application is expected to exceed 30° C, as drift is more likely to occur. Ensure that spray equipment used to apply herbicide is properly cleaned before using to apply any other chemicals. Avoid spraying under conditions of high humidity or fog to prevent drift to adjacent crops.**

***Dycleer 24 (600 g/L)*** For selective control of broadleaf weeds on roadsides. Apply Dycleer 24 in 45 to 90 litres of water per acre when weeds are actively growing. For poison ivy control use 227 litres of water per acre. Thorough coverage of foliage is necessary to control weeds.

| Species Suppressed | | Rate Per Acre |
|---|---|---|
| top growth of:<br>absinthe<br>Canada thistle<br>leafy spurge | <br>poverty weed<br>perennial sow thistle<br>scentless mayweed | 1.11 L |
| poison ivy | | 1.72 L |
| perennial sow-thistle<br>common ragweed<br>false ragweed<br>giant ragweed<br>English daisy<br>goldenrod | wild carrot<br>tansy ragwort<br>Canada thistle*<br>field bindweed*<br>top growth of curled dock | 2.23 L<br>*Apply to regrowth of perennial sow-thistle, Canada thistle and field bindweed in summer and fall. |
| diffuse knapweed<br>goat's-beard<br>ground cherry<br>pasture sage | poverty weed<br>sheep sorrel<br>thyme-leaved spurge | 4.45 L |

Do not apply on or near desirable trees or plants, or in locations where chemical may be washed into contact with the roots. Apply in the morning or late in the evening when air temperature is between 10 and 25° C. Do not contaminate domestic or irrigation waters. Thoroughly clean application equipment after use.

SPRAY DRIFT PRECAUTIONS:

Dycleer 24 may cause injury to desirable trees and plants, particularly sunflowers, canola, soybeans, flowers, fruit trees, ornamentals, peas, potatoes and tomatoes. Do not treat areas where downward movement into the soil or surface washing may bring Dycleer 24 herbicide into contact with the roots of desirable plants. Avoid making applications where spray may drift onto nearby sensitive crops. Do not spray near sensitive crops when winds are gusty or in excess of eight km/hour and moving towards sensitive crops. Leave an adequate buffer zone between areas to be treated and sensitive plants. Do not apply Dycleer 24 in the vicinity of sensitive crops when the temperature on the day of application is expected to exceed 30° C, as drift is more likely to occur. Ensure that spray equipment used to apply Dycleer 24 herbicide is properly cleaned before re-using to apply any other chemicals.

Apply using ground equipment only. Avoid overlapping and shut off spray booms while starting, turning, slowing or stopping as injury to desirable grass species may result.

Do not allow spray to drift into agricultural land or severe crop injury may result. Extreme care must be taken to prevent drift.

***Desormone 700 (700 g/L), Diphenoprop 700 (679 g/L)*** Controls several broadleaf weeds including alfalfa, bull thistle, burdock, buttercup, Canada thistle, chicory, cinquefoil, curled dock, dandelion, dogbane, goldenrod, goat's beard, hawkweed, horsetail, milkweed (top growth) mullein, plantain, perennial sow thistle, sweet clover, tansy, teasel, toadflax (partial control), vetch, wild carrot, yellow rocket and most annual weeds.

Apply 1.42 to 2.02 L Desormone in 80 to 200 L per acre water or 1.42 L Diphenoprop 700 in 80 to 240 L per acre water in early summer. The higher water volume will ensure better coverage, particularly where high grass cover is present. Some species of weeds may require a second treatment. Spray weed infested areas with an even pattern, making sure weeds shielded by high grass are thoroughly wetted. Spray tall weeds to run-off. **Note:** This material forms an emulsion in water – not a solution. This tends to separate on standing. Provide agitation to prevent such separation and ensure a uniform spray mixture.

For brush species see *Brush Control* section of the Guide.

***Diphenoprop 600 (582 g/L) Estaprop (582 g/L)*** Controls several broadleaf weeds. Apply 1.62 L/acre in 90 to 270 L/acre water. The higher water volume will assure better coverage, particularly where high grass cover is present. Spray when weeds are actively growing.

Weeds Suppressed:

bull thistle
burdock
buttercup
Canada thistle
chicory
cinquefoil

curled dock
dandelion
dogbane
goldenrod
goat's-beard
hawkweed

horsetail
plantain
perennial sow thistle
teasel
wild carrot
yellow rocket

and annual weeds as indicated in the *Field Crops Chart*.

Do not allow spray or vapour to drift onto crops which can be damaged such as canola, sunflowers, peas, beans, sugar beets, tomatoes, clovers, alfalfa, potatoes, turnips, vegetables, flowers, trees or shrubs. Do not spray close to these crops. Coarse sprays are less likely to drift. Do not spray during periods of high winds or temperatures above 25°C.

***Garlon 4 (480 g/L)*** Controls broadleaf weeds (including burdock, chicory, curled dock, dandelion, field bindweed, lamb's quarters, ragweed, smartweed, smooth bedstraw, vetch and wild lettuce) on rights-of-way and industrial sites. Apply Garlon 4 at 0.405 to 1.62 L/acre in enough water for uniform coverage. Use 80 L or more of spray solution per acre, using no more than 55 psi (350 kPa) spraying pressure with nozzles which produce large droplets to reduce spray drift. Spray when wind velocity is 16 km/hr or less and use suitable thickening agent such as Nalco-Trol, follow manufacturer's directions for the correct mixing sequence.

***Glean (75%)*** Although Glean is registered for use on roadsides, this treatment **is not recommended in Manitoba** due to the potential for rapid buildup of resistant weed species. Controls several broadleaf weeds. Apply at 0.028 kg/acre in 90 to 180 L/acre water to rough turf including quackgrass, crested wheatgrass, brome, and bluegrass species for selective weed control. Temporary chlorosis or suppression of grass growth may occur. The addition of Agsurf, Agral 90 or Citowett Plus at a rate of 1 litre for each 1,000 litres of spray mixture is recommended. To minimize drift, a drift control agent should be added at the recommended label rate.

Controls wild carrot, sweet clover, kochia, and suppresses Canada thistle, wild strawberry, wild rice, perennial sow-thistle, goldenrod, horsetail, and dandelion.

Apply Glean post-emergence to young actively growing weeds. Do not apply to frozen ground, soils saturated with water or during periods of heavy rainfall. Adequate moisture is needed to activate the herbicide.

To avoid washing of the herbicide to non-target areas, avoid applying during extremely rainy periods or when soils are heavily saturated. Do not apply to sites that slope into fields unless the areas are separated by a ditch. Do not spray where run-off may carry the herbicide onto agricultural land and or other desirable plantings or into any water sources that may be used for irrigation purposes.

**NOTE: Sulfonyl urea resistant kochia and Russian thistle has developed in Manitoba. Glean will not control these weeds. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

***Kil-mor (500 g/L)*** Controls bull thistle, chicory, goat's-beard, white cockle and several other broadleaf weeds. Apply 1.42 L/acre in sufficient water for good coverage. For best results apply in the spring when plants are actively growing. Do not apply Kil-mor if the stand contains legumes.

***Tordon 101 (300 g/L)*** Controls several broadleaf weeds. Apply 2.83 L/acre in 90 L/acre of water to control weeds such as Canada thistle, sweet and red clover, wild carrot, common ragweed, dandelion, goldenrod, dock, plantain, prickly lettuce, burdock, fleabane and vetch. Apply in the spring or early summer after growth appears. Use Norbak 60 B particulating agent or other registered drift control systems.

Most broadleaved plants are very sensitive to Tordon herbicides. Care should be taken to avoid spraying desirable broadleaved plants or allowing spray mist to drift onto these plants during both growing and dormant periods. Tordon 101 mixture, with or without a drift control system, should not be applied near areas planted to field beans, soybeans, canola, sunflowers, potatoes, fababeans, tomatoes, flowers, ornamental shrubs, or other broadleaf crops. In addition, care should be taken to avoid contaminating soil where sensitive crops will be grown. Do not make hay from treated vegetation due to the possibility of Tordon contamination of manure from animals fed the hay. Applications by aircraft or ground sprayers should be made only when there is no hazard from drift. (Coarse sprays are less likely to drift.) Do not apply by aircraft in agricultural areas.

Care should be taken to prevent contamination of water used for irrigation, drinking, or other domestic purposes.

*Use of this product is restricted to authorized applicators.*

***2,4-D Amine or LV Ester*** Controls several broadleaf weeds. Apply 1.11 to 2.23 L of formulations containing 500 g/L 2,4-D in 400 L water. Use sufficient water for thorough coverage of foliage and apply when the weeds are actively growing. Deep rooted perennial weeds such as Canada thistle will require repeated application as new growth appears.

Very Susceptible: wild mustard

Susceptible: stinkweed, lamb's-quarters, common ragweed, vetch, tumbling mustard, hare's ear mustard, ball mustard.

Moderately Susceptible: Russian pigweed, wild radish, shepherd's purse, common plantain, burdock, sweet clover, blue bur, cocklebur, dandelion (in lawns), flixweed, goatsbeard

Moderately Resistant: Russian thistle, curled dock, peppergrass, annual sow thistle, field bindweed, red root pigweed, wild buckwheat, Canada thistle, smartweeds, field dandelion, tartary buckwheat, perennial sow thistle, chickweed, hoary cress

Perennials: Top growth control only: leafy spurge, Russian knapweed, and horsetail.

For product volumes of other 2,4-D formulations *see Table 21*.

# Brush Control

**Provincial pesticide use permits are required prior to applying herbicides for brush control in the following circumstances:**

- application of a herbicide to private property to which the public normally has access, such as golf courses, camp grounds and parks
- application of herbicides by government departments, crown corporations, municipal corporations, school boards or on crown lands or rights-of-way on behalf of private corporations other than farm corporations

Use permit applications may be obtained from the Environmental Control Branch of the Department of Environment and Workplace Safety and Health.

Several alternative herbicides are available for brush control. Applicators should be aware of the alternatives for each situation, and the limitations or concerns associated with each herbicide.

Tordon products are residual and may damage desirable vegetation if off-target movement occurs. Dicamba products restrict grazing after application. All brush control products can cause damage to adjacent vegetation if off-target drift occurs.

Select brush control herbicides only after considering suitability of brush to be controlled, restrictions on use of treated area, potential damage to adjacent areas, cost and public concern.

***Banvel (480 g/L), DyCleer (480 g/L)*** Controls western snowberry (buckbrush), wolf willow, trembling aspen, alder and wild rose. Tank mix 2.10 L Banvel or 2.10 L DyCleer with 4.0 L of formulations containing 500 g/L 2,4-D amine or LV ester in 1000 L water. Apply to the point of run-off in June when leaves are fully expanded. Cut brush and trees over 6.6 ft (2.0 m) and spray regrowth when it develops. For product volumes of other 2,4-D formulations see Table 21.

For balsam poplar, basswood, birch, elm, black cottonwood, spruce, pine, balsam fir, tamarack, white cedar, hickory, vine maple, red oak, and bur oak apply a tank mix of 4.0 L DyCleer with 8.0 L of formulations containing 500 g/L 2,4-D amine or LV ester in 1000 L water. For product volumes of other 2,4-D formulations see Table 21. Apply to the point of run-off in June when leaves are fully expanded. Cut brush and trees over 6.6 ft (2.0 m) and spray regrowth when it develops.

To control sugar maple or white ash apply a tank mix of 5.21 L DyCleer with 7.1 L Diphenoprop 700 in 1000 L water. Apply in June to coniferous and deciduous species when leaves are fully expanded. Apply to the point of run-off. Brush and trees over 6.6 ft (2.0 m) should be cut and regrowth sprayed when it develops.

***Desormone LV 700 (700 g/L), Diphenoprop 700 (679 g/L)*** To control alder, aspen, basswood, balsam fir, birch, buckbrush, bur oak, elm, ground juniper, hawthorne, hazel, honeysuckle, Manitoba maple, poison ivy, poplar, raspberry, rose (some regrowth), Scotch pine, silver maple, sumac, tamarack, white cedar, wild plum, wild raspberry, willow.

*Foliage method:*

Apply spray to both foliage and stems of all plants from the time foliage is fully developed in spring until plants go dormant. For effective control, all leaves, stems and suckers must be thoroughly wet to ground line. Add 7.0 to 10.0 L of Desormone or 8.5 to 11.25 L of Diphenoprop 700 per 1000 L of water, mix thoroughly and apply with power equipment. Some regrowth of resistant species such as ash, oak and maple may be expected.

To control mixed deciduous and coniferous species such as aspen, alder, cherry, balsam poplar, basswood, birch, elm, bur oak, spruce, pine, balsam fir, tamarack and white cedar apply a mixture of 6.0 L Desormone or 7.15 L of Diphenoprop 700 plus 6.25 L Dycleer per 1000 L of water when the leaves of deciduous species are fully expanded. Cover all foliage and stems to the point of runoff. Brush over 6.0 ft (1.8 m) should be cut and regrowth sprayed when it develops.

*Basal bark method:*

Wet the base of all stems until the spray puddles on all sides and collects around the root collar at ground line. May be applied in any season. Apply Desormone with the basal bark method on scattered brush, or as a second spray on species resistant to a first foliage spray. Mix 20.0 to 27.0 L Desormone or Diphenoprop 700 in 1000 L of oil. Apply using low volume knapsack sprayer or power equipment. Concentrations will depend upon species present, volume of spray used and season applied.

*Modified basal method:*

Drench the base of plants, then wet the remaining stems and leaves to run off, spraying 4/5 of the plants from the bottom up. Treat when brush is in full foliage. This method may be used where susceptible species have been controlled by prior sprays and resistant species remain. Drenching the base of plants and wetting all stems to run-off is essential for complete control.

*Early season spraying:*

Add 7.0 to 10.0 L of Desormone to 100 L of diesel oil and mix thoroughly, then add this mixture to 810 L water. Or add 1 L Diphenoprop 700 to 10 L of diesel oil and mix thoroughly, then add this mixture to 100 L water. Stir thoroughly before spraying, particularly if mixture is allowed to stand for more than one hour after mixing.

*During dry weather:*

Add 10 L Desormone to 180 L of diesel oil and mix thoroughly, then add this mixture to 810 L water. Or add 1 L of Diphenoprop 700 to 15 L diesel oil and mix thoroughly, then add this mixture to 85 L water. Stir thoroughly before spraying, particularly if material is allowed to stand for more than one hour after mixing.

*Cut surface method:*

Stump: Can be used at any time of year but is most effective when applied as soon as possible after trees are cut. Spray the entire stump, particularly bark and exposed roots. A thorough drenching is essential for complete control. Spray is most effective on stumps 3 to 4 inches (8 to 10 cm) and larger.

Mix 27.0 L of Desormone or 27.5 L of Diphenoprop 700 in 1000 L of oil. Apply with a low volume knapsack sprayer using a solid cone nozzle of medium orifice.

*Frill method:*

Make a frill using an axe to cut overlapping notches in a continuous ring around the trunk near its base. Cut through the bark but do not remove the chips. Recommended for cull trees, 5 to 6 inches (13 to 15 cm) in diameter or larger. Treat freshly cut frills at any time of year.

Mix 27.0 L of Desormone or 27.5 L of Diphenoprop 700 in 1000 L of oil. Pour in as much mixture as the frill will hold without wasting chemical.

*To prepare spray:*

Add one half of the required amount of water or oil to spray tank, then add the product with agitation, and finally, the balance of the water or oil with continuous agitation.

**Note:** If this material is to be used in straight oil mixture, do not let water get into it or finished mixture.

**Note:** This material forms an emulsion in water – not a solution. This tends to separate on standing. Provide agitation to prevent such a separation and ensure a uniform spray mixture.

***DyCleer*** see Banvel.

***DyCleer 24 (600 g/L)*** Controls western snowberry (buckbrush), wolf willow, trembling aspen, alder, wild rose, cherry. Apply 5.0 L in 1000 L water.

To control balsam poplar, basswood, birch, elm, black cottonwood, bur oak, white spruce, pine, balsam fir, tamarack and white cedar, apply 10 L in 1000 L water. Apply in June when leaves are fully expanded. Thoroughly wet foliage. Brush and trees over 6.6 ft (2.0 m) should be cut and regrowth sprayed when it develops.

***Diphenoprop 600 (582 g/L) Estaprop (582 g/L)*** To control hawthorn, poplar, Scotch pine, sugar maple, white cedar, wild cherry, wild plum and wild raspberry, foliar apply 8.75 L per 1000 L water.

To control alder, aspen, basswood, balsam fir, birch, bur oak, blueberry, elderberry, elm, ground juniper, hardback, hazel, hickory, honeysuckle, Manitoba maple, poison ivy, raspberry, red pine, rose (some regrowth), sumac, silver maple, tamarack, white oak, wild apple, willow, foliar apply 11.7 L in 1000 L water.

For best results apply on the foliage and stems just prior to or just after brush is in full leaf in the late spring or early summer. Many species may require retreatment the following year. Thoroughly wet down all foliage and stem to ground level. Apply 305 to 610 L/acre of spray mixture depending on brush density and height.

*Basal Treatment:*

To control susceptible and intermediate species apply 3.25 L in 100 L fuel oil. Hard to kill species can be controlled by increasing the rate to 5.1 L in 100 L fuel oil. The solution can be applied to the basal part of the standing brush anytime of the year. This treatment is not effective for basswood and ash. Apply thoroughly to cause runoff on all sides of stems from ground line to 3.3 ft (1.0 m).

*Stump Treatment:*

Apply 3.25 L to 100 L fuel oil to tree stumps immediately after cutting by spraying or painting stumps, exposed roots and cut surface. Thorough drenching is essential.

*Frill Treatment:*

Apply 3.25 L in 100 L fuel oil. Cut frills with axe (downward) close together around the trunk without removing bark. Spray or paint exposed wood until runoff. This method is recommended for resistant standing trees of more than 5 to 6 inches (13 to 15 cm) in diameter.

***Garlon 4 (480 g/L)*** To control brush species (including alder, ash, aspen, basswood, birch, buckthorn, cottonwood, dogwood, hawthorn, maples, poplar, sumac, tamarack, wild rose, willow, chokecherry, elm, red maple, oaks, pines, blackberry, elderberry, poison oak, witch hazel, and raspberry) on rights-of-way and industrial sites, apply 4.0 to 8.0 L per 1000 L as a foliar spray solution.

Apply when woody plants are actively growing. Do not treat woody plants which exceed 8.2 ft (2.5 m) in height. Use higher rates on ash, chokecherry, elm, maple, oaks, pines or for late summer applications when plant growth rates are reduced.

*Stem – foliage treatment:*

Apply 4.0 to 8.0 L in enough water to make 1000 L of spray mixture. Spray to the point of runoff. Coverage should be thorough to wet all leaves, stems and root collars; do not exceed 1400 kPa pressure at the nozzle.

*Broadcast treatment:*

Apply 1.62 to 3.24 L/acre in a minimum of 90 L spray solution per acre. Do not exceed 275 kPa at the nozzle.

*Basal bark treatment:*

Use 1.0 to 3.0 L in enough diesel oil, No. 1 or No. 2 fuel oil or Kerosene to make 100 L of spray mixture. Apply with knapsack sprayer or power spray equipment using low pressure of 150 to 275 kPa. Spray the basal parts of brush and tree trunks to a height of 20 inches (50 cm) from the ground. Thorough wetting is required and spray to the drip point at the ground line. Apply at any time, including winter months, except when snow or water prevent spraying to the ground.

*Dormant spray treatment:*

Mix 0.5 to 1.5 L in enough oil to make 100 L of spray. Apply with a knapsack or power spray equipment using low pressure of 150 to 275 kPa. Treat any time the brush is dormant and most of the foliage has dropped. Thoroughly wet the stems down to and including the root collar. For root suckering species also spray the ground under the plants to cover small root suckers which may not be visible above the soil surface. Brush of average density and 5 to 6.6 ft (1.5 to 2 m) high may take up to 567 L of spray mixture per acre.

*Thin line basal bark treatment:*

To control woody plants with stems less than 6 inches (15 cm) in diameter, apply undiluted in a thin stream to all sides of the stems about 6 inches (15 cm) above the ground line. The stream should be directed horizontally to apply a narrow band around each stem or clump. From 2 to 15 mL of chemical will be required for treatment of single stems and from 25 to 100 mL to treat clumps of stems. Use a sprayer capable of being calibrated to deliver the small amounts of herbicide required. Use a nozzle orifice of size #1 or #1 1/2 to provide the thin streams required.

*Cut stump treatment:*

Make a mixture in diesel oil, No. 1 or No. 2 fuel oil or Kerosene at a proportion of 1 part Garlon 4 to 30 parts oil and apply this mixture to freshly cut stumps or susceptible brush. Be sure to thoroughly wet all cut surfaces as well as the remaining bark to the ground line. Care must be taken to ensure treatment of all cut stems in a clump of brush.

***Gramoxone (200 g/L)*** Controls balsam fir, black spruce, cedar, red pine, Scotch pine and tamarack. Apply 2.23 to 4.45 L/acre in 405 L/acre water to give a good spray coverage of the trees.

***Krenite (480 g/L)*** Controls oak, maple, common alder, hazel, ash, elm, poplar, willow, birch, aspen, pine and balsam fir. Apply 10 to 15 L in 1000 L water. Add 1 to 2 L surfactant to 1000 L mixture. Apply at high pressure in 200 to 1200 L/acre; the volume depends upon height, density and type of brush. Spray to wet. Apply from mid-June to late September.

Krenite activity is often delayed and plants will remain green for most of the season after treatment. Susceptible plants will fail to leaf out the spring following treatment. This treatment is useful where browning of foliage is undesirable. If rainfall occurs within 24 hours effectiveness may be decreased.

***NaTA TCA (85%)*** Controls conifers. Apply 9.0 to 11.3 kg product in 454 L water to give a good spray coverage of the trees. Spray during the growing season.

***Roundup (356 g/L)*** Controls birch, poplar, raspberry, western snowberry (buckbrush) and willow. Apply one part per 100 parts water to actively growing brush (June through August). Spray coverage must be uniform and complete for best results. Do not spray to run-off.

***Tordon 101 (300 g/L)*** Controls coniferous and deciduous species. Apply 4.5 L of product in 450 L water and drench foliage. Apply to woody plants 6.6 to 8.2 ft (2.0 to 2.5 m) tall up to three weeks before the first killing frost. **Use of this product is restricted to authorized applicators.** Care should be taken to prevent contamination of water for irrigation, drinking or other domestic purposes.

***2,4-D LV Ester*** Controls birch, honeysuckle, scrub poplar, western snowberry (buckbrush), willows, wolf willow and regenerated poplar. Apply 1.62 to 3.64 L/acre of formulations containing 500 g/L 2,4-D in not less than 90 L water, with ground equipment. Apply 1.62 to 3.64 L/acre of formulations containing 500 g/L 2,4-D in 13.6 to 27.1 L/acre diesel oil for application by aircraft. For product volumes of other 2,4-D formulations refer to Table 21. Apply between June 15 and July 15, before abscission layer is formed.

***Weedone CB (160 g/L)*** Controls red oak, white oak, bur oak, red maple, ash, birch, white pine, balsam fir, American elm, spruce, aspen, pin cherry, choke cherry, poison ivy. Weedone CB is a ready to apply formulation.

*Basal Bark Treatment:*

To control mixed brush up to 4 inches (10 cm) DBH (trunk diameter at breast height) apply undiluted to lower 18 to 24 inches (45 to 60 cm) of plant stem. Treat all around the stem including the root collar area and exposed roots. To control conifers larger than 2 inches (5 cm) DBH, or cherry, ash and maple, increase treatment height to cover the lower 36 inches (91 cm) of stem bark.

Basal bark treatment will control top growth of root-suckering species such as aspen, but regrowth from lateral roots may occur the following growing season.

*Stump Treatment:*

Control stems larger than 4 inches (10 cm) DBH by cutting the tree, leaving an 18 to 24 inch (45 to 60 cm) tall stump and treating the sides and root collar area of the remaining stump.

Apply using a hand pump backpack sprayer or a hand-carried pump-up pressurized sprayer. Refer to product label for specifics on nozzle selection.

Do not dilute with water. Do not apply when stems are wet. Rainfall which follows application to dry stems does not normally reduce brush control. Do not graze meat or dairy animals on treated area.

Weedone CB affects O-rings and other seals in certain sprayer units. For details on clean-out and maintenance of sprayers, refer to the product label.

## Dormant Spraying

***2,4-D LV Ester*** Controls birch, honeysuckle and poplar. Apply 1.62 L/acre of formulations containing 500 g/L 2,4-D in 13.6 L/acre diesel oil for application by aircraft. For product volumes of other 2,4-D formulations refer to Table 21. Applications of 2,4-D LV ester in a mixture of 13.6 L/acre diesel oil and 4.45 L/acre water have given good control when applied to poplar at bud stage. Caution is required to maintain the spray mixture by agitation and to prevent freezing of equipment. However, do not over agitate, as gel may form. This application does not give effective control of undergrowth or regenerated poplar. A foliar application is usually required two to three years after application of the dormant spray.

***2,4-D LV Ester*** Controls birch, honeysuckle and poplar. Apply 1.62 to 3.64 L/acre of formulations containing 500 g/L 2,4-D in 112 to 169 L diesel oil applied with ground equipment. For product volumes of other 2,4-D formulations refer to Table 21.

## Spot Treatment

***Hyvar XL (240 g/L)*** Controls alder, maple, aspen, ash, sumac, balsam poplar, oak, elm, basswood, hawthorn, willow, birch, spruce, dogwood and pine. Apply in spring or summer, undiluted, using an exact delivery hand gun which delivers a thin stream of a measured volume when triggered. Apply one, 8.0 ml deposit directed at the base of brush (root collar area) for plants up to 1.0 m (3.3 feet) in height, and four to five deposits on taller brush. An extra deposit may be required to control ash. For larger areas requiring non-selective brush control, apply one 8.0 ml deposit on a 1.0 to 1.2 m (3.3 to 3.4 foot) grid.

Hyvar XL may also be applied diluted, 1.0 L Hyvar XL with 5.0 L water, using a back-pack or large volume equipment. Apply 55 ml per deposit rather than 8.0 ml as recommended above.

**CAUTION:** *Do not apply to brush in standing water. Water from treated ditches should not be used for irrigation. Do not apply in areas where desirable trees or shrubs are immediately adjacent to the treated area.*

## Product Amount for Small Areas

***Most recommendations are based on amount of product per acre. When applying a herbicide to a small area, use the following conversion, unless otherwise specified in the recommendations.***

***For a 1076 sq ft (100 $m^2$) area:***

*To convert from L/acre to mL/1076 sq ft (100 $m^2$), multiply by 25 [eg. 2.5 L/acre – use 62.5 mL per 1076 sq ft (100 $m^2$)].*

*A spray volume of 5 to 10 L/1076 sq ft (100 $m^2$) is suitable for application using a hand sprayer. This is equivalent to 200 to 400 L/acre.*

## Before Planting

### Preplant Incorporated

***Rival (500 g/L), Treflan EC (545 g/L), Triflurex (400 g/L)*** Tolerant species include American elm, caragana, green ash, Scotch pine and Siberian elm. Controls barnyard grass, chickweed, cow cockle, green and yellow foxtail, kochia, lamb's-quarters, prostrate knotweed, purslane, red root pigweed, Russian thistle, volunteer oats, wild buckwheat and wild oats. **Caution: Populations of green foxtail tolerant to trifluralin have developed in Manitoba. Rival/Treflan/Triflurex will not control trifluralin tolerant foxtail.**

Apply:

| | SOIL TEXTURE | |
|---|---|---|
| **Herbicide** | **Light texture: sandy, sandy loam less than 6% organic matter** | **Heavy texture: loam, silt, silty loam, clay, silt clay 6-15% organic matter** |
| Rival | 1.8 L/acre | 3.6 L/acre |
| Treflan EC | 1.62 L/acre | 3.32 L/acre |
| Triflurex | 2.22 L/acre | 4.45 L/acre |

Apply in 45 L/acre water to soil surface and incorporate in the same operation if possible. For soil incorporation instructions see *Herbicide Incorporation* section. Do not delay incorporation more than 24 hours after application.

### Preplant - Postemergence to Weeds

***Roundup (356 g/L)*** Controls absinthe, annual blue grass, annual sow-thistle, Canada blue grass, Canada thistle, cattail, common milkweed, common ragweed, curled dock, downy brome, field bindweed, green and yellow foxtail, hemp dogbane, hoary cress, Kentucky blue grass, knotweed, kochia, lady's thumb, lamb's-quarters, prickly lettuce, mustard, poison ivy, quackgrass, red root pigweed, Russian thistle, shepherd's-purse, smooth brome grass, toadflax, wild buckwheat, wild oats and wild vetch. Apply 1.92 to 2.83 L/acre in 45 L/acre water when the weeds are in the proper stage for control. Refer to the *Perennial Weed Control on Cropland* section and the *Special Weed Problems* section for details on application rates and timing.

## After Planting
## *(New or Established)*

### Preemergence or Early Postemergence to Weeds

***Afolan F (480 g/L), Lorox L (480 g/L)*** Controls annual smartweed species, annual sow-thistle, barnyard grass, common chickweed, dandelion (seedlings only), goosefoot, green and yellow foxtail (suppression only), groundsel, hemp nettle, knotweed, kochia, lamb's-quarters, perennial sow-thistle (seedlings only), plantain (seedlings only), prostrate pigweed, purslane, ragweed, red root pigweed, shepherd's-purse, stinkweed, wild buckwheat, wild radish and wormseed mustard. Apply 1.9 to 3.8 L/acre Afolan F or 1.82 to 3.65 L/acre Lorox L in 160 to 220 L/acre water. Do not apply with pressure greater than 40 psi (275 kPa). Apply as an overall spray to dormant stock or as a directed spray if buds have broken. Apply before or immediately after weeds emerge but before they are 4 to 6 inches (10 to 15 cm) tall. Do not apply Afolan F until at least 10 days after tree transplanting or Lorox L until trees have been established one year. Afolan F or Lorox L may be tank mixed with Gramoxone.

### Postemergence to Weeds

***Afolan F (480 g/L) or Lorox L (480 g/L) plus Gramoxone (200 g/L)*** Controls grasses and broadleaf weeds. Apply 2.23 to 4.45 L/acre Gramoxone plus 1.9 to 3.8 L/acre Afolan F or 1.82 to 3.64 L/acre Lorox L in 220 to 445 L/acre water directed to base of trees. Avoid contact with tree foliage.

**CAUTION:** *Do not use on small conifers without protection.*

***Gramoxone (200 g/L)*** Controls annual grasses and broadleaf weeds and top growth of perennials. Apply 2.23 to 4.45 L/acre in 220 to 445 L/acre water when weeds and grass are 4 to 6 inches (10 to 15 cm) tall. Repeat application if regrowth occurs. Direct spray on the weeds and avoid contact with the tree foliage. Wet foliage thoroughly. For patch treatment use 75 mL in 10 L water per 1076 square feet (100 square metres).

**CAUTION:** *Do not use on small conifers without protection.*

## Established More Than One Year

### Preemergence to Weeds

***Casoron 4 G (4%)*** Controls several grasses and broadleaf weeds such as annual blue grass, annual smartweed species, chickweed, green and yellow foxtail, field horsetail, groundsel, knotweed, lamb's-quarters, pineappleweed, purslane, red root pigweed, shepherd's-purse, annual spurge and wild mustard. Apply 44.5 to 70.8 kg/acre product in fall or spring. Use the lower rate on lighter soils. Avoid using on light sand or gravel soils. Do not cultivate or work into the soil. Avoid applications when soil temperatures are high. *Tolerant species include caragana, cutleaf weeping birch, crabapple, euonymus, juniper, and maple. Species not tolerant and which should be avoided include firs, hemlock, lilac, spruce and mugho pine. For further information see manufacturer's label.*

***Princep Nine-T (90%), Simadex 80 W (80%), Simazine 80 W (80%)*** Tolerant species include American elm, boxelder maple, caragana, green ash and Siberian elm. Controls annual smartweed species, annual sow-thistle, ball mustard, barnyard grass, bluebur, chickweed, common ragweed, dog mustard, false ragweed, flixweed, giant ragweed, hare's-ear mustard, hemp nettle, hoary alyssum, Indian mustard, kochia, lady's-thumb, lamb's-quarters, night flowering catchfly, oak-leaved goosefoot, prostrate knotweed, prostrate pigweed, purslane, red root pigweed, Russian pigweed, shepherd's-purse, stinkweed, tumble mustard, tumble pigweed, volunteer clover, wild buckwheat, wild mustard, wild oats, wild radish and wormseed mustard. Apply 2.02 to 3.04 kg/acre Princep Nine-T or 2.23 to 3.34 kg/acre Simadex 80 W or Simazine 80 W in 200 L/acre water. Apply to trash free soil. Treatment should be made in the fall preferably, or in the early spring before the weeds emerge. Injury may occur to trees grown in saline soil.

### Postemergence to Weeds

***Amitrol-T (200 g/L)*** Controls annual blue grass, barnyard grass, blue grasses, Canada thistle, chickweed, cocklebur, common burdock, common groundsel, dandelion, dock, field horsetail, foxtail barley, goldenrod, green and yellow foxtail, hemp nettle, hoary cress, lamb's-quarters, knotweed, kochia, milkweed, mustard, night-shade, night flowering catchfly, pigweed, plantain, poison ivy, purslane, ragweed, shepherd's-purse, smartweed, sow-thistle, toadflax, volunteer alfalfa, wild buckwheat, wild oats, witch grass and yellow rocket. Apply 14.2 L/acre in 200 L/acre water. See the *Special Weed Problems* section for details on application rates and timing. Avoid contact with tree foliage, shoots or green bark. Apply to wet all weed foliage.

***Roundup (356 g/L)*** Controls absinthe, annual blue grass, annual sow-thistle, Canada blue grass, Canada thistle, cattail, common milkweed, common ragweed, curled dock, downy brome, field bindweed, green and yellow foxtail, hemp dogbane, hoary cress, Kentucky blue grass, knotweed, kochia, lady's-thumb, lamb's-quarters, prickly lettuce, mustard, poison ivy, quackgrass, red root pigweed, Russian thistle, shepherd's-purse, smooth brome grass, toadflax, wild buckwheat, wild oats and wild vetch. Apply 1.92 to 2.83 L/acre in 45 L/acre water when the weeds are in the proper stage for control. Apply only to shelterbelts containing caragana, elm, lilac, maple, mountain ash, poplar, Russian olive, willow, fir, juniper, pine, spruce or yew. Spray may contact mature bark only. Avoid contact with foliage, green bark or suckers. Spray coverage must be uniform and complete. Do not spray to runoff. Refer to *Perennial Weed Control on Cropland* and the *Special Weed Problems* section for details on application rates and timing. Heavy rainfall within two hours after application may wash the chemical off the foliage and a repeat treatment may be required. Rainfall occurring within six hours after application may reduce effectiveness.

## Vegetation Management

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**For information on vegetation management refer to Manitoba Agriculture publication *Vegetation Management.***

## Product Amounts for Small Areas

Most recommendations are based on amount of product per acre. When applying a herbicide to a small area, use the following conversion, unless otherwise specified in the recommendations.

***For a 1076 sq ft (100 $m^2$) area:***

To convert from L/acre to mL/1076 sq ft (100 $m^2$), multiply by 25 [Eg. 2.5 L/acre – use 62.5 mL per 1076 sq ft (100 $m^2$)].

A spray volume of 5.0 to 10 L/1076 sq ft (100 $m^2$) is suitable for application using a hand sprayer. This is equivalent to 200 to 400 L/acre.

This section identifies specific weeds and the herbicide use recommended to give control. Most of the recommendations are for use only on non-cropland. A few specific recommendations may be used on cropland. The crop has been indicated in each case but the user must refer to the particular crop section or the product label for further information on the correct crop stage for spraying and application instructions.

Recommendations for use in field, forage and horticultural crops can be found in the appropriate summary charts.

NOTE:

(A) Amitrol-T: **This is a non-selective, systemic herbicide. Thoroughly wet the actively growing vegetation. Short term soil sterility will occur if excessive herbicide contacts the ground. Direct spray onto the weed to avoid excessive ground application.**

(B) Tordon 22 K: **This is a systemic herbicide effective for control of broadleaf weed and tree species. It can be used to control biennials and deep-rooted perennials on rangeland, grass pastures, cropland and non-cropland. *It is recommended as a spot treatment only.* Tordon 22 K is extremely active, highly soluble in water with residues that persist in treated soil for several years. Follow directions carefully. It is only to be applied by authorized applicators.**

## *Absinthe*

***2,4-D LV Ester (500 g/L)*** Spray 1.82 L/acre in late June prior to flowering. Re-treat regrowth in late summer when the plants have 6 to 10 inches (15 to 25 cm) of new growth. More than one season of treatment may be required. See Table 21 for product volumes of other 2,4-D formulations.

## *Baby's Breath (perennial)*

***Banvel (480 g/L), DyCleer (480 g/L)*** Apply 3.72 L/acre in 45 to 90 L/acre water when actively growing.

## *Bladder Campion*

***Tordon 22 K (240 g/L)*** Apply 3.80 L/acre. See Note B.

See Manitoba Agriculture factsheet *Bladder Campion – A Persistent Perennial* for additional information.

## *Canada Thistle (on non-cropland)*

*For recommendations for Canada thistle on cropland see Perennial Weed Control on Cropland* section.

***Amitrol-T (200 g/L)*** Apply 14.2 L/acre in at least 200 L/acre water applied at early flowering stage (patch treatment). Use the higher rate during periods of cool or dry weather. Allow three weeks after treatment before disturbing the root system. See Note A.

***Banvel (480 g/L), DyCleer (480 g/L), DyCleer 24 (600 g/L)*** Apply 1.0 L/acre Banvel or 1.01 L/acre DyCleer or 2.23 L/acre DyCleer 24 in 45 to 90 L/acre water. Apply when thistles are in the early bud stage. Allow three weeks after treatment before disturbing the root system.

***Laredo (356 g/L), Roundup (356 g/L), Wrangler (356 g/L)*** Apply 2.43 L/acre in 45 L/acre water or 75 to 125 ml in 6.5 L water/1076 square feet (100 square metres) when most plants are in the bud to bloom stage. Do not disturb treated plants for at least 10 days following treatment.

***Tordon 22 K (240 g/L)*** Apply 1.82 L/acre in 160 L/acre water from rosette stage in the spring through flowering but before the first heavy frosts in the fall. See Note B.

***2,4-D amine*** Apply 1.82 L/acre of formulations containing 500 g/L 2,4-D at the early bud stage. Allow three weeks after treatment before disturbing the root system. For product volumes of other 2,4-D formulations refer to Table 21.

## *Cattail*

***Laredo (356 g/L), Roundup (356 g/L), Wrangler (356 g/L)*** Apply 2.83 to 4.86 L/acre in 45 L/acre water when cattails are in the mid-to-late flowering stage (mid-July to mid-August) and are actively growing. Heavy rainfall within 2 hours of application may wash chemical off the foliage and a repeat treatment may be required. Rainfall occuring within 6 hours after application may reduce effectiveness.

***Caution:*** *Avoid direct application to any body of water. Use this treatment only when ditches are dry so no water contamination will occur.*

***Amitrol T (200 g/L)*** Apply 18.2 to 22.3 L of Amitrol T in 80 to 200 L water/acre. Apply after the cattails are fully formed and up to frost. Do not disturb sprayed plants. Do not apply where water will be used for irrigating, drinking or other domestic uses. Do not apply where water is not wholly confined to user's property.

## Curled Dock

***Banvel (480 g/L), DyCleer (480 g/L), DyCleer 24 (600 g/L)*** Apply 0.92 L/acre Banvel or DyCleer or 2.23 L/acre DyCleer 24 in 45 to 90 L/acre water to actively growing weeds for top growth control.

***Laredo (356 g/L), Roundup (356 g/L), Wrangler (356 g/L)*** Apply 2.83 to 4.86 L/acre in 45 L/acre water when most plants have reached the early bud stage. Do not disturb treated plants for at least 10 days following treatment. Heavy rainfall within 2 hours after application may wash chemical off the foliage and a repeat treatment may be required. Rainfall occurring within 6 hours after application may reduce effectiveness.

***MCPA amine, 2,4-D amine*** Apply 0.445 to 0.69 L/acre of formulations containing 500 g/L MCPA or 2,4-D amine to give top growth control. For product volumes of other MCPA and 2,4-D formulations refer to Table 21.

## Cypress Spurge

***2,4-D amine*** Apply 1.82 L/acre of formulations containing 500 g/L 2,4-D amine, before the flowering stage. For product volumes of other 2,4-D formulations refer to Table 21.

## Field Bindweed

***Banvel (480 g/L), DyCleer (480 g/L), DyCleer 24 (600 g/L)*** Apply 1.0 L/acre Banvel or 1.01 L/acre DyCleer or 2.23 L/acre DyCleer 24 in 45 to 90 L/acre water. Apply when field bindweed is in the flowering stage and allow three weeks after treatment before resuming normal summerfallow tillage.

***Basagran (480 g/L)*** Apply 0.71 L/acre followed by 0.71 L/acre 7 to 10 days later. Apply in 90 to 160 L/acre water before field bindweed has developed a dark green color and before it has begun trailing. Use a recommended surfactant (See recommendations under the appropriate crop).

***Embutox 625 (625 g/L), Cobutox (400 g/L), 2,4-D Butyric 400 (400 g/L)*** Apply Cobutox or 2,4-D Butyric 400 at 1.42 L/acre or Embutox 625 at 0.91 L/acre at the early flowering stage.

***Laredo (356 g/L), Roundup (356 g/L), Wrangler (356 g/L)*** Apply 2.83 to 4.86 L/acre in 45 L/acre water at the bud stage. Do not disturb plants for at least 10 days following treatment. Heavy rainfall within 2 hours after application may wash chemical off the foliage and a repeat treatment may be required. Rainfall occurring within 6 hours after application may reduce effectiveness.

***Tordon 22 K (240 g/L)*** Apply 3.64 L/acre. See Note B.

***Tropotox Plus (400 g/L)*** Apply 1.72 L/acre at the early flowering stage.

***2,4-D amine*** Apply 1.82 L/acre of formulations containing 500 g/L 2,4-D amine, at early flowering stage. For product volumes of other 2,4-D formulations refer to Table 21.

## Field Horsetail

***Amitrol-T (200 g/L)*** Apply 14.2 L/acre in at least 200 L/acre water (patch treatment). Use the higher rate during periods of cool or dry weather. Repeat as necessary. See Note A.

***MCPA amine, potassium and sodium salt mixtures*** Apply 0.57 L/acre of formulations containing 500 g/L MCPA, after the weeds have fully emerged for top growth control. May be used in wheat, oats, barley, flax and rye. For product volumes of other MCPA formulations see Table 21.

## Foxtail Barley

***Gramoxone (200 g/L)*** Apply 2.23 L/acre in 445 L/acre water or 75 mL in 10 L water/1076 square feet (100 square metres) for top growth control only.

***Kerb 50-W (50%)*** Apply 0.364 to 0.445 kg/acre product in 90 L/acre water between October 1 and freezeup. Use the lower rate on grey-wooded soils or where perennial bluegrass or fescues are the predominant pasture species. Do not use Kerb for foxtail barley removal in seed grass stands or desired forage stands of timothy or fescue grass species. At recommended rates, pasture stands of perennial bluegrass and fescue may be reduced by 10 to 15 per cent. Where perennial bluegrass and fescues are the dominant pasture species, use the lower rate of Kerb. Spray overlaps may seriously harm desirable pasture grass species. Where foxtail barley comprises most of the grass stand and reseeding to a desirable grass species is required, delay seeding into the Kerb treated soil until the end of June. Do not harvest or graze within 60 days after application with Kerb. Avoid using Kerb on soils having more than six per cent organic matter.

***Laredo (356 g/L), Roundup (356 g/L), Wrangler (356 g/L)*** Apply 1.92 L/acre in 45 L/acre water. Apply in June to actively growing plants. Do not disturb treated plants for at least 10 days following treatment. Heavy rainfall within 2 hours after application may wash chemical off the foliage and a repeat treatment may be required. Rainfall occurring within 6 hours after application may reduce effectiveness.

## Goldenrod

***Banvel (480 g/L), DyCleer (480 g/L), DyCleer 24 (600 g/L)*** Apply 0.92 L/acre Banvel or 0.91 L/acre DyCleer or 2.23 L/acre DyCleer 24 in 45 to 90 L/acre water when the weed is actively growing.

## Hemp Dogbane

***Laredo (356 g/L), Roundup (356 g/L), Wrangler (356 g/L)*** Apply 2.83 to 4.86 L/acre when hemp dogbane is in the early bud stage. Apply in 45 L/acre water. Do not disturb treated plants for at least seven days after application. Heavy rainfall within 2 hours after application may wash chemical off the foliage and a repeat treatment may be required. Rainfall occurring within 6 hours after application may reduce effectiveness.

***2,4-D amine or LV ester*** Apply 1.38 to 1.82 L/acre of formulations containing 500 g/L 2,4-D, in fall before frost and while plant leaves are green. For product volumes of other 2,4-D formulations refer to Table 21.

## Leafy Spurge

***Amitrol-T (200 g/L)*** Apply 22.3 L/acre in at least 200 L/acre water (patch treatment). Use the higher rate during periods of cool or dry weather. See Note A.

***Banvel (480 g/L), DyCleer (480 g/L), DyCleer 24 (600 g/L)*** Apply 0.84 L/acre Banvel or DyCleer or 1.11 L/acre DyCleer 24 in 45 to 90 L/acre water for top growth control when the weed is actively growing.

***Tordon 22 K (240 g/L)*** Apply 3.64 L/acre. See Note B.

***2,4-D amine*** Apply 1.82 L/acre of formulations containing 500 g/L 2,4-D at early flowering stage. Repeat at least once to new growth later in the season. Control of established plants and new seedlings will require continued applications for a period of at least four to five years. For product volumes of other 2,4-D formulations refer to Table 21.

## Milkweed

***Amitrol-T (200 g/L)*** Apply 14.2 L/acre in at least 200 L/acre water. Apply before flowering (patch treatment). Use the higher rate during periods of cool or dry weather. See Note A.

***Laredo (356 g/L), Roundup (356 g/L), Wrangler (356 g/L)*** Apply 4.86 L/acre in 45 L/acre water or 125 mL in 6.5 L water/1076 square feet (100 square metres). Apply when most plants have reached the bud to bloom stage. Reduced results may occur on plants treated after full bloom. As not all milkweed plants reach the required stage of growth at the same time, repeat treatments may be required. Do not disturb plants for 10 days following treatment. Do not apply to plants covered with dirt. Heavy rainfall within 2 hours after application may wash chemical off the foliage and a repeat treatment may be required. Rainfall occurring within 6 hours after application may reduce effectiveness.

## Nodding Thistle

***2,4-D amine*** Apply 0.91 L/acre of formulations containing 500 g/L 2,4-D amine in June and re-treat in September. For product volumes of other 2,4-D formulations refer to Table 21.

## Poison Ivy

***Amitrol-T (200 g/L)*** Apply 4.45 L/acre in at least 200 L/acre water. Apply after full leaf has developed but before coloring in the fall. See Note A.

***Laredo (356 g/L), Roundup (356 g/L), Wrangler (356 g/L)*** Apply 2.83 to 4.86 L/acre in 45 L water after full leaf has developed in spring. Heavy rainfall within 2 hours after application may wash chemical off the foliage and a repeat treatment may be required. Rainfall occurring within 6 hours after application may reduce effectiveness.

Other herbicides are registered for control of poison ivy but are not recommended as the above recommendations generally provide more consistent control.

## Poverty Weed

***Banvel (480 g/L), DyCleer (480 g/L), DyCleer 24 (600 g/L)*** Apply 1.86 L/acre Banvel or DyCleer or 4.45 L/acre DyCleer 24 in 45 to 90 L/acre water when weed is actively growing. Banvel at 0.61 L/acre or DyCleer 24 at 1.11 L/acre will provide only top growth control.

## Red Bartsia

***2,4-D amine or LV ester*** Apply 0.57 L/acre of formulations containing 500 g/L 2,4-D in 45 L/acre water. On hayland treat within 10 days after first cutting. Roadsides and pastures should be sprayed as soon as the red bartsia appears, usually in early July. Re-treat if necessary for later germination. For product volumes of other 2,4-D formulations refer to Table 21.

## Scentless Chamomile

***Banvel (480 g/L), DyCleer (480 g/L), DyCleer 24 (600 g/L)*** Apply 0.51 L/acre Banvel or DyCleer or 1.11 L/acre DyCleer 24 in 45 to 90 L/acre water to actively growing weeds for top growth control.

***Tordon 22 K (240 g/L)*** Apply 0.445 L/acre to control established plants. See Note B.

## Snow on the Mountain

***2,4-D amine*** Apply 0.91 L/acre of formulations containing 500 g/L 2,4-D amine in June and re-treat when necessary. For product volumes of other 2,4-D formulations refer to Table 21.

## Sow-Thistle (on non-cropland)

*For recommendations for perennial sow thistle control on cropland see Perennial Weed Control on Cropland* section.

***Amitrol-T (200 g/L)*** Apply 14.2 L/acre in at least 200 L/acre water at flowering stage (patch treatment). Use the higher rate during periods of cool or dry weather. Allow three weeks after treatment before disturbing the root system. See Note A.

***Banvel (480 g/L), DyCleer (480 g/L), DyCleer 24 (600 g/L)*** Apply 1.0 L/acre Banvel or DyCleer or 2.23 L/acre DyCleer 24 in 45 to 90 L/acre water when thistles are in the early bud stage. Allow three weeks after treatment before disturbing the root system.

***Laredo (356 g/L), Roundup (356 g/L), Wrangler (356 g/L)*** Apply 2.83 to 4.86 L/acre in 45 L/acre water when most plants have reached early bud stage of growth. Allow seven or more days after application before disturbing the root system. Heavy rainfall within two hours after application may wash chemical off the foliage and repeat treatment may be required. Rainfall occurring within six hours after application may reduce effectiveness.

***2,4-D amine*** Apply 1.82 L/acre of formulations containing 500 g/L 2,4-D amine at early bud stage. For product volumes for other 2,4-D formulations see Table 21. Allow three weeks after treatment before disturbing the root system.

***Tordon 22 K (240 g/L)*** Apply 1.82 L/acre in 160 L/acre water. See Note B.

## Stinging Nettle

***2,4-D amine*** Apply 0.91 to 1.82 L/acre of formulations containing 500 g/L 2,4-D amine. For product volumes of other 2,4-D formulations see Table 21.

## Tansy

***Tordon 22 K (240 g/L)*** Apply 3.64 L/acre. See Note B.

## Tansy Ragwort

***Banvel (480 g/L), DyCleer (480 g/L), DyCleer 24 (600 g/L)*** Apply 0.91 L/acre Banvel or DyCleer or 2.23 L/acre DyCleer 24 in 45 to 90 L/acre water when weeds are actively growing.

***2,4-D*** Apply 1.13 L/acre of formulations containing 500 g/L 2,4-D. For product volumes of other 2,4-D formulations refer to Table 21.

## Toadflax

***Amitrol-T (200 g/L)*** Apply 14.2 L/acre in at least 200 L/acre water (patch treatment). Use the higher rate during periods of cool or dry weather. See Note A.

***Estaprop (582 g/L)*** Apply 0.71 L/acre in 45 to 80 L/acre water in wheat or barley for toadflax suppression. Apply when majority of toadflax are no taller than 6 inches (15 cm). The use of Estaprop for suppression of toadflax in wheat or barley should be part of a long-term planned approach for toadflax control, which includes spring and fall tillage, fall patch spraying, summerfallow or chemical fallow.

***Laredo (356 g/L), Roundup (356 g/L), Wrangler (356 g/L)*** Apply 2.83 to 4.86 L/acre when most plants have reached the early bud stage of growth. Allow seven or more days after application before tillage. See *Herbicide Information* section for specific application instructions.

***Tordon 22 K (240 g/L)*** Apply 3.64 L/acre. See Note B.

***2,4-D*** Apply 1.82 to 3.64 L/acre of formulations containing 500 g/L 2,4-D repeated annually to reduce infestation. For product volumes of other 2,4-D formulations refer to Table 21.

## White Cockle

***Banvel (480 g/L) plus MCPA amine or potassium salt or 2,4-D amine*** To control seedlings apply a tank mix of 0.118 L/acre Banvel plus 0.34 L/acre of formulations containing 500 g/L 2,4-D or MCPA. For product volumes of other MCPA and 2,4-D formulations refer to Table 21.

## Yarrow

Plants are resistant to 2,4-D. Timely mowing will assist in starving the root system and will prevent seed set.

## NOTE:

**(A) Amitrol-T This is a non-selective, systemic herbicide. Thoroughly wet the actively growing vegetation. Short term soil sterility will occur if excessive herbicide contacts the ground. Direct spray onto the weed to avoid excessive ground application.**

**(B) Tordon 22 K This is a systemic herbicide effective for control of broadleaf weed and tree species. It can be used to control biennials and deep-rooted perennials on rangeland, grass pastures, cropland and non-cropland. *It is recommended as a spot treatment only.* Tordon 22 K is extremely active, highly soluble in water with residues that persist in treated soil for several years. Follow directions carefully. It is only to be applied by an authorized applicator.**

## Poisonous Weeds

Many well known plants contain poisonous substances that will cause death or severe reactions if ingested by humans or animals. House plants such as dumbcane *(Dieffenbachia)*, ornamental shrubs such as Oleander, garden plants such as the leaf of rhubarb, or beans of the castor bean (an ornamental plant) are a few examples.

Some agronomic crops may become poisonous at certain stages of growth or when subjected to adverse growing conditions such as frost. Volunteer grain plants that are frozen can be quite toxic to livestock because of high levels of nitrate that accumulate in the frozen plant. The same effect can occur with annual weed species such as pigweed, lamb's-quarters and mustard.

Many poisonous plants in their natural state are unpalatable to livestock. However, they may become quite palatable when sprayed with a herbicide for control of the problem weed.

**CAUTION:** *When poisonous plants are being sprayed, keep livestock away from the treated area for at least one week.*

## Arrow Grass

Eradication is impractical. Fence off large patches.

## Death Camus

***2,4-D*** Apply 2.71 L/acre of formulations containing 500 g/L 2,4-D when plants are in early bud stage. Retreat second and third year as necessary. For product volumes of other 2,4-D formulations refer to Table 21.

## Locoweeds and Milk Vetches

***2,4-D*** Apply 1.82 to 2.71 L/acre of formulations containing 500 g/L 2,4-D when plants are in full bloom stage. Re-treatment is necessary. For product volumes of other 2,4-D formulations see Table 21.

## Water Hemlock

***2,4-D*** Apply 1.82 L/acre of formulations containing 500 g/L 2,4-D, from early growth to early bud stage. Thorough coverage is essential. Re-treatment may be necessary. For product volumes of other 2,4-D formulations see Table 21.

## Western Snowberry (buckbrush), Wolf Willow

***Banvel (480 g/L) or DyCleer (480 g/L) plus 2,4-D amine or LV ester, DyCleer 24 (600 g/L)*** Apply 0.84 L/acre Banvel or DyCleer tank mixed with 1.82 L/acre of formulations containing 500 g/L 2,4-D, or 2.02 L/acre DyCleer 24 in 405 L/acre water. For product volumes of other 2,4-D formulations refer to Table 21.

***2,4-D*** Apply 1.82 L/acre of formulations containing 500 g/L 2,4-D in not less than 90 L/acre water with ground equipment. For product volumes of other 2,4-D formulations refer to Table 21.

***2,4-D LV Ester*** Apply 1.82 L/acre of formulations containing 500 g/L 2,4-D in 15 to 27 L/acre diesel oil for application by aircraft. Treat at full leaf stage. Apply between June 15 to July 15 before abscission layer is formed. Good spray coverage is essential. Retreatment may be necessary the following year. For product volumes of other 2,4-D formulations refer to Table 21.

Desiccation is the chemically accelerated drying of plants. It facilitates the harvesting of plants that are cultivated for seeds, fruits, or tubers where the survival of leaves and stems after harvest is of no importance. Harvesting is made easier by the removal of unwanted foliage and weeds, and while desiccation does not speed up maturity, it will reduce the time from maturity to harvest.

When applying Reglone do not over-spray sloughs or wet lands. Do not allow spray to drift onto adjacent crops, farm sites or shelterbelts.

## Alfalfa, Bird's-foot Trefoil, Red Clover

***Reglone (200 g/L)*** Apply 0.6 to 0.81 L/acre in 90 to 200 L/acre water at 200 to 275 kPa (30 to 40 psi) by ground or 0.81 to 1.32 L/acre in 25 to 45 L/acre water with aircraft. Apply the lower rate to normal stands that have a few weeds. Apply the higher rates on dense stands or on weedy crops. Apply when a majority of seed in the pods is nearing maturity. To prevent seed pods from shattering and subsequent loss of seed, the interval between spraying and harvest should not exceed seven days. To improve the treatment effectiveness Agral 90 should be added at the rate of 1 L/1000 L spray mixture.

Do not apply Reglone if a residual herbicide such as Princep Nine-T, Simazine or Sinbar has been used on the legume stand within the previous 12 months.

## Adzuki Beans, Dry Beans (Navy, White and Red-Kidney) and Soybeans

***Reglone (200 g/L)*** For ground application apply 0.6 to 0.81 L/acre in at least 120 L/acre water at 200 to 275 kPa (30 to 40 psi). Use the higher rate on dense stands or on weedy crops. For aerial application apply 0.81 L/acre in at least 20 L/acre water in light stands or fields free from weeds. In heavy stands or in fields which contain weeds apply 1.11 L/acre in at last 25 L/acre water. Apply by means of a fixed wing aircraft fitted to apply a uniform spray coverage. Time the spray application to coincide with 80 to 90 per cent natural leaf defoliation of bean plants. Desiccation of weeds is completed in a week. To provide more uniform coverage, add Agral 90 at a rate of 1 L/1000 L of spray mixture.

## Field Peas

***Reglone (200 g/L)*** For ground application apply 0.6 to 0.81 L/acre in 90 to 200 L/acre water at 200 to 275 kPa (30 to 40 psi). Use the higher rate on dense stands or on weedy crops. For aerial application apply 0.81 L/acre in at least 20 L/acre water in light stands or in fields free from weeds. In heavy stands or in fields which contain weeds, apply 1.11 L/acre in 20 L/acre water. Apply by means of a fixed winged aircraft fitted to apply a uniform spray coverage. Spray when the crop has reached maturity. This treatment does not mature peas. Add Agral 90 at the rate of 1 L/1000 L spray mixture to provide for a more uniform coverage and complete desiccation.

## Flax

***Reglone (200 g/L)*** For ground application apply 0.6 to 0.81 L/acre in 90 to 200 L/acre water at 200 to 275 kPa (30 to 40 psi). Use the higher rate on dense stands or on weedy crops. For aerial application apply 0.81 L/acre in at least 20 L/acre water in light stands or in fields free from weeds. For heavy stands or fields which contain weeds, apply 1.11 L/acre in 20 L/acre water. Apply with a fixed wing aircraft fitted to apply a uniform spray coverage. Spray when flax has fewer than 25 per cent green bolls (normal swathing time). Add Agral 90 at a rate of 1 L/1000 L spray mixture to provide for a more uniform coverage and complete desiccation.

## Lentils

***Reglone (200 g/L)*** Apply when the very lowest pods are yellow and are beginning to rattle. For ground applications, apply 0.6 to 0.81 L/acre in 60 to 225 L/acre water in light stands or in stands with very few weeds. In heavier stands or in stands with moderate to heavy weed populations, use 0.81 L/acre in 60 to 225 L/acre. For aerial applications, use 0.6 L/acre in light stands, 0.81 L/acre in good stands with few weeds and 1.5 L/acre in dense stands or stands with moderate to heavy weed populations. All aerial applications should use 20 L/acre water volume. Add Agral 90 at a rate of 1 L per 1000 L spray solution to improve coverage.

## Mustard

***Reglone (200 g/L)*** For ground application apply 0.6 to 0.81 L/acre in 90 to 200 L/acre water at 200 to 275 kPa (30 to 40 psi). Use higher rate on dense stands or on weedy crops. For aerial application apply 0.81 L/acre in at least 20 L/acre water in light stands or fields free from weeds. In heavy stands or in fields which contain weeds, apply 1.11 L/acre in 20 L/acre water. Apply by means of a fixed winged aircraft fitted to apply uniform spray coverage. Spray when the crop is at the 55 to 75 per cent seed turn (green to brown) stage. Note: Add Agral 90 at the rate of 1 L/1000 L spray mixture to provide for a more uniform coverage and complete desiccation.

## Rapeseed (including Canola)

***Reglone (200 g/L)*** For ground application apply 0.6 to 0.81 L/acre in 90 to 200 L/acre water at 200 to 275 kPa (30 to 40 psi). Use higher rate on dense stands or to weedy crops. For aerial application apply 0.81 L/acre in at least 20 L/acre water in light stands or fields free from weeds. Apply 1.11 L/acre in 20 L/acre water in heavy stands or in fields which contain weeds. Use a fixed winged aircraft fitted to apply uniform spray coverage. Spray when the crop is at the 60 to 75 per cent seed turn (green to brown) stage. Note: Add Agral 90 at the rate of 1 L/1000 L spray mixture to provide for a more uniform coverage and complete desiccation. Do not straight combine Argentine varieties. Wait three days after spraying, then swath.

## Sunflowers

***Reglone (200 g/L)*** Apply 0.61 L/acre in 20 L/acre water. Spray when the back of the heads turn yellow and the bracts have started to turn from green to yellow. Seed moisture should be less than 40 per cent. Apply by means of a fixed winged aircraft fitted to apply a uniform spray coverage. Add Agral 90 at the rate of 1 L/1000 L spray mixture to provide for more uniform coverage.

## Potatoes

***Reglone (200 g/L)*** *Ground application:* For heavy top growth or weedy fields apply 1.72 L/acre. For light top growth and little weed growth apply 1.11 L/acre.

For mature top growth (little or no weed growth) apply 0.81 L/acre with Agral 90 added at the rate of 1 L/1000 L spray solution. Apply with a boom sprayer using at least 225 to 450 L/acre water.

Aircraft application: Apply 0.81 to 1.11 L/acre in at least 20 L/acre water followed by a second application four to five days later of 0.61 L/acre in at least 20 L/acre water. Use a fixed winged aircraft fitted to apply uniform spray coverage.

**NOTE: Browning of the vascular ring of potato tubers sometimes occurs after the use of vine killers. Do not spray exposed tubers.**

# Aerial Application

## Application Requirements and Recommendations:

- Do not spray in winds above 15 km/h (nine mph). Within ½ hour of sunrise or sunset, do not spray in winds above 10 km/h (six mph).
- Do not use nozzle pressures above 30 psi (200 kPa) except where specified for the product being applied.
- Avoid spraying when the relative humidity is below 40 per cent.
- Mount nozzles to direct spray horizontally towards the rear of the plane.
- To apply higher volumes use larger nozzles instead of adding more nozzles of the same size.
- Do not spray when the wind is blowing towards a nearby sensitive crop, garden or shelterbelt.
- Do not spray in a dead calm near sensitive plants.
- Except when applying Avadex BW granules, fly at a height of 3 to 6 feet (1 to 2 metres) from the wheels to the crop, or as low as conditions permit for safe operation.
- Shut off spray before pulling up over trees, powerlines or other obstructions. Make sure equipment is kept clean and that all nozzle shutoffs are working properly at all times.
- Use water as a carrier rather than oil to avoid crop injury.

The herbicides included in Table 19 can be applied by air. For liquids a minimum water volume of 15 L/acre is recommended to reduce drift damage. For flax use a minimum water volume of 25 L/acre.

**TABLE 19 AERIAL RECOMMENDATIONS FOR FIELD CROPS**

| PRODUCT | Cereals | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Barley | Oats | Rye | Triticale | Wheat | Canary Seed | Faba beans | Flax | Forage Grasses | Forage Legumes | Lentils | Mustard | Peas | Rapeseed[e] | Sugar beets | Sunflowers |
| Avadex BW Granular | X | | | | X | | | X | | X | | X | | X | X | |
| Avenge | X | | X[f] | X[g] | X[c] | X | | | X | X | | | | | | |
| Banvel | X | X | X | | X | | | | | | | | | | | |
| Buctril M | X | X | | | X | | | | | | | | | | | |
| Carbyne 2 EC | X | | | | X | | X | X | X | X | X | X | X | X | X | X |
| DyVel | X | X | | | X | | | | | | | | | | | |
| Fortress | X | | | | X | | | X | | | | X | | X | | |
| Hoe-Grass 284 | X[b] | | | | X | | | X | | | | | | X | | |
| Mataven L | | | | X | X | X | | | X | X | | | | | | X |
| MCPA amine (including Aeromin), MCPAK | X | X | X[a] | | X | | | X | | | | | | | | |
| Poast | | | | | | | | X | | | X | | X | X | X | |
| 2,4-D amine (including Aeromin) | X | | X | | X | | | | X[d] | | | | | | | |

[a] MCPA amine only

[b] Do not use Hoe-Grass on Norbert, Klages, Betzes or Glenn barley

[c] Avenge may be used on Benito, Canuck, Chester, Columbus, Fielder, Glenlea, HY320, Katepwa, Leader, Macoun, Neepawa and Selkirk wheat only

[d] Use WEEDAR 80 (2,4-D amine) only

[e] Including triazine tolerant canola.

[f] Cougar, Puma, Frontier, Rymin, Kodiak varieties only

[g] Welsh, Carman varieties only

## Liquids (Aerial application)

***CAUTION:** Take all possible precautions to prevent drift damage to susceptible crops, shelterbelts, gardens and yard areas.*

***Avenge 280-C (280 g/L)*** Controls wild oats in barley, canary seed and wheat (Benito, Canuck, Chester, Columbus, Fielder, Glenlea, HY320, Katepwa, Leader, Macoun, Neepawa and Selkirk wheat only), triticale (Welsh and Carman only), winter wheat (Norstar and Sundance only) and fall rye (Cougar, Puma, Frontier, Rymin, Kodiak only), and the following seedling forages when underseeded to wheat or barley – alfalfa, bird's-foot trefoil, red and sweet clover, creeping red fescue, red fescue, meadow fescue, bromegrass, timothy, crested wheatgrass, orchardgrass, Russian wild ryegrass, reed canarygrass and Kentucky bluegrass. Apply 1.01 to 1.21 L/acre in 8.0 to 20 L/acre water. Use the higher rate when there are more than 18 wild oat plants per square foot (200 wild oat plants/square metre). Do not apply after the 6 leaf stage of barley, wheat or canarygrass.

Apply when wild oats are in the 3 to 5 leaf stage. Do not apply when wind exceeds 15 km/h (nine mph). Make application as close to the growing crop as possible. For tank mixing with broadleaf herbicides, choose only those products registered for aerial application and refer to the label of the broadleaf herbicide. Do not graze or feed treated cereal crops to livestock for 8 weeks after application. Do not graze or harvest treated forage grasses or legumes for forage during the year of treatment.

***Banvel (480 g/L)*** Controls several broadleaf weeds. See *Field Crops Chart*. Banvel can be applied to barley, oats, rye and wheat. Apply Banvel alone at 0.093 L/acre or tank mix with the amine or potassium formulations of MCPA or the amine formulation of 2,4-D at 0.344 L/acre of the 500 g/L formulations of MCPA or 2,4-D. Apply in not less than 8.1 L/acre water. Banvel should be applied at the 2 to 3 leaf stage of crop growth. Do not spray when winds are above 15 km/h (nine mph) or when wind is blowing towards nearby sensitive crops, gardens or shelterbelts. Do not mix Banvel with any spray additives.

***Buctril M (560 g/L)*** Controls several broadleaf weeds in barley, oats and wheat. See *Field Crops Chart*. Apply Buctril M at 0.405 L/acre in at least 8.0 L/acre water. This product contains a contact herbicide, therefore thorough coverage of weeds is important. A water volume of 16 to 20 L/acre is preferred. Swath width must not exceed length of the spray boom.

Apply when weeds are in the 2 to 4 leaf stage and before the crop shields the weeds. Barley, oats and wheat can be safely treated until the early shot blade stage but weeds will not be adequately controlled once the crop shields the weeds.

This treatment will give some top growth control of Canada thistle and perennial sow thistle but regrowth can be expected.

***Carbyne 2 EC (240 g/L)*** Controls wild oats. For cereal crops, special crops and forages. *See Table 19.* Apply Carbyne 2 EC at 0.6 to 0.7 L/acre. For sugar beets apply 0.81 to 1.42 L/acre. Carbyne 2 EC should be applied in 10 to 18 L/acre water. Use a nozzle pressure of 300 kPa (45 psi). Application should be made when the majority of wild oats are in the 2 leaf stage and the crop is dry (no dew or rain) and not later than 14 days after emergence of wild oats, wheat, barley, flax and lentils. Optimum control will be achieved by spraying 7 to 10 days after wild oats emergence. Fly at a height of 8.2 ft (2.5 m) above the crop.

***DyVel (420 g/L)*** Controls several broadleaf weeds. See *Field Crops Chart*. DyVel can be applied to barley, oats and wheat. Apply DyVel at 0.51 L/acre when the crop is in the 2 to 3 leaf stage. Apply in not less than 8.1 L/acre water. Do not spray when winds are above 15 km/h (9 mph) or when wind is blowing towards nearby sensitive crops, gardens or shelterbelts. Do not mix DyVel with any spray additives. Do not use nozzle pressure above 30 psi (200 kPa).

***Hoe-Grass 284 (284 g/L)*** Controls barnyard grass, green and yellow foxtail and wild oats. For wheat, barley (except Klages, Norbert, Glenn and Betzes), rapeseed and flax apply at 1.01 L/acre. For all crops, apply in no less than 15 L/acre water at a pressure of no less than 45 psi (300 kPa). Apply when the grassy weeds are in the 1 to 4 leaf stage and before tillering. Application under hot (above 27° C) or droughty conditions will result in reduced weed control.

Hoe-Grass 284 must be applied in the 1 to 4 leaf stage of barley and before tillering (stooling). Application beyond this stage will result in crop damage. Certain environmental conditions should be avoided when applying Hoe-Grass 284 on barley, i.e. prolonged cool, humid periods, drought and frost.

Do not tank mix Hoe-Grass 284 with any herbicide (for example, Pardner, 2,4-D, MCPA) as crop damage and reduced grassy weed control will result. Herbicides for the control of broadleaf weeds must be applied at least 4 days after the application of Hoe-Grass 284.

Do not tank mix Hoe-Grass 284 with any insecticide, fungicide, fertilizer or chemical additive. Do not use raindrop nozzles. Avoid application if rain is expected within 1 hour.

Do not spray Hoe-Grass 284 if the wind speed is more than 13 km/h (8 mph).

***Mataven L (52.5 g/L)*** Controls wild oats in wheat, triticale, canary seed, sunflowers and the following seedling forages – alfalfa, bromegrass, meadow fescue, creeping red fescue, Russian wild ryegrass, intermediate wheatgrass and crested wheatgrass. Use only on varieties recommended for production in Manitoba. See *1990 Field Crop Variety Recommendations*. Mataven can also be applied for wild oat control in red clover, bird's-foot trefoil, sainfoin and cicer milk vetch grown for seed production. Apply 2.02 L/acre except on forage grasses grown without a companion crop where a rate of 3.04 L/acre should be used. Use a total spray volume of not less than 8.0 L/acre. Apply when wild oats are in the 3 to 6 leaf stage and before the crop is past the 6 leaf stage.

***MCPA amine (barley, oats, wheat)*** Controls several broadleaf weeds. See *Field Crops Chart*. Apply 0.51 to 0.69 L/acre of formulations containing 500 g/L MCPA when the crop is in the 3 leaf to early shot blade stage. If only wild mustard, lamb's-quarters and spring seedlings of stinkweed and flixweed are present, the rate can be reduced to 0.34 L/acre of formulations containing 500 g/L MCPA. For product volumes of other MCPA amine formulations see Table 21.

***MCPA amine (Flax)*** Controls several broadleaf weeds. See *Field Crops Chart*. Apply 0.51 to 0.69 L/acre of formulations containing 500 g/L MCPA in 25 L/acre water. Apply MCPA from the time flax is 2 inches (5 cm) tall until just before bud stage. Some delay in maturity and crop injury may result from use of the higher rates, but will most often be more than offset by increased yields if the infestation of susceptible weeds is moderate to high. If only wild mustard, lamb's-quarters and spring seedlings of stinkweed or flixweed are present, the rate can be reduced to 0.34 L/acre of formulations containing 500 g/L MCPA. For product volumes of other MCPA amine formulations see Table 21.

***MCPA amine, 2,4-D amine (Rye, spring or fall)*** Controls several broadleaf weeds. See *Field Crops Chart*. Apply 0.51 to 0.69 L/acre of formulations containing 500 g/L MCPA or 2,4-D. Apply MCPA when spring rye is in the 3 leaf to early shot blade stage, or when fall rye commences growth in the spring until the early shot blade stage. Apply 2,4-D from the 4 leaf to early shot blade stage. Only a few brands of 2,4-D are registered for application in the fall. If only wild mustard, lamb's-quarters and spring seedlings of stinkweed or flixweed are present, the rate can be reduced to 0.34 L/acre of formulations containing 500 g/L MCPA or 2,4-D. For product volumes of other MCPA and 2,4-D formulations see Table 21.

***Poast (184 g/L)*** Controls several grassy weeds in flax, lentils, rapeseed (canola), soybeans, peas, beans, potatoes, onions and sugar beets. See *Field Crops Chart*.

Apply:

| WEED | RATE (L/acre) |
|---|---|
| green or yellow foxtail<br>barnyard grass, proso millet, witchgrass and volunteer corn | 0.325 - 0.405 |
| wild oats | 0.57 - 0.65 |
| volunteer wheat and oats | 0.65 |
| volunteer barley | 0.65 - 0.77 |

Where a rate range is specified for a weed, use the higher rate to control heavy infestations. Apply in 10 to 20 L/acre of water at a minimum nozzle pressure of 275 kPa (40 psi). Add 0.20 to 0.405 L/acre of Assist Oil Concentrate. Apply when weeds are in the 1 to 6 leaf stage with the majority in the 2 to 5 leaf stage. Control may be reduced if grasses are not actively growing due to drought, flooding, or prolonged cool conditions (15° C or less). Do not tank mix with other herbicides. Allow a 4 day interval between application of Poast and other herbicides. Do not seed cereals, forage grasses or corn into Poast treated fields for at least 14 days following Poast application. A cultivation to a 4 inch (10 cm) depth is required 7 days prior to reseeding Poast-treated fields to grass crops (such as corn, cereals or forage grasses) in the year of treatment. Note: Do not apply Poast + Merge by air. Do not apply Poast & Power Pack by air.

**CAUTION:** *Cereal crops, corn, and forage grasses are* ***extremely sensitive*** *to Poast drift. Do not apply if the wind is blowing towards adjacent fields of cereals, corn, or forage grasses. As these crops comprise a major portion of Manitoba's cropped acreage, opportunities to safely apply Poast by air will be very limited.*

***2,4-D amine (barley and wheat)*** Controls several broadleaf weeds. See *Field Crops Chart*. Apply 0.51 to 0.69 L/acre of formulations containing 500 g/L 2,4-D when the crop is in the 4 leaf to early shot blade stage. If only wild mustard, lamb's-quarters and spring seedlings of stinkweed or flixweed are present, the rate can be reduced to 0.34 L/acre of formulations containing 500 g/L 2,4-D. For product volumes of other 2,4-D amine formulations see Table 21.

***MCPAK (400 g/L)*** Controls hemp nettle and other MCPA susceptible weeds in wheat, oats, barley and flax. See *Field Crops Chart*. Apply at 0.85 L/acre when weeds are in the 1 to 4 leaf stage. Some injury to flax or delay in flax maturity may result.

## Granular (Aerial Application)

***Avadex BW Granular (10%)*** Controls wild oats. Apply at the rates indicated for specific crops. Fly at a height of 29.7 feet (9 m). Incorporate according to instructions in *Herbicide Incorporation* section. The granular formulation is more suited to fall applications than to spring application. Do not apply Avadex BW liquid by air.

Do not seed domestic oats the year after treatment with Avadex BW.

*Barley*

At 7.08 kg/acre product applied in the fall or before seeding in the spring.

*Wheat*

At 6.07 kg/acre product applied in the fall.

*Flax, mustard, rapeseed, sugar beets*

At 7.08 to 9.11 kg/acre product applied in the fall or before seeding in the spring.

***Fortress (14%)*** Controls wild oats and green foxtail. Apply at the rates indicated for specific crops. Fall application after September 15 (but before soil freeze-up) or spring application prior to seeding the crop. Fly at a height of 29.7 feet (9 m). Incorporate according to instructions in *Herbicide Incorporation* section.

Oats, sugar beets and small seeded forage grasses may be injured if planted within 24 months of application.

*Spring and Durum wheat*

Use 4.45 to 6.88 kg/acre product in the fall or 4.45 to 5.67 kg/acre product in the spring before seeding.

*Spring Barley*

Use 4.45 to 6.88 kg/acre product in the fall or before seeding in the spring.

*Rapeseed (including canola), Flax, Mustard*

Use 5.67 to 6.88 kg/acre product in the fall or before seeding in the spring.

**CAUTION: Trifluralin-resistant green foxtail has developed in Manitoba. Fortress will not control trifluralin-resistant foxtail. Refer to 'Resistance of Weeds to Herbicides' at the front of this publication for further information.**

**For further aerial recommendations see Brush Control and Desiccation sections.**

# Herbicide Incorporation

Manitoba Agriculture does not recommend fall application of soil applied herbicides to soils which are subject to wind or water erosion. Fall application to summerfallow fields or to soils with light trash cover or to light textured soils may predispose the field to erosion by wind and water and is not recommended.

## *Avadex BW (liquid or granular)*

The liquid formulation must be incorporated into soil that is free of lumps or trash. The granular formulation may be incorporated into trashy soil and is best suited for fall use. For fall applications of Avadex BW Granular apply and incorporate between September 15 and freeze-up. For spring applications, incorporate after seeding when using the product in wheat and before seeding in all other labelled crops. (Although Avadex BW may be applied and incorporated after seeding in the case of barley, wild oat control is generally less acceptable than when applied before seeding. In wheat, lower rates must be used before seeding to minimize crop injury and consequently wild oat control will be more consistent if Avadex BW is applied after seeding wheat.)

Incorporate to a depth of two inches (five cm) by setting disc or cultivator implements to cut three inches (7.5 cm) into the soil. Mixing the product to greater depths will dilute the herbicide, decreasing wild oat control, and may cause injury to cereals. Ensure that cereals are seeded below the treated layer (two to three inches; five to 7.5 cm). If the herbicide is applied and incorporated after seeding (as in wheat or barley), avoid ridging the soil by incorporating with harrows. For the liquid formulation, cultivate, disc or harrow the chemical into the soil the same day as application. For granular formulations, incorporate as soon as possible but within 48 hours of application. A second incorporation should be performed at right angles to the first. For fall applications, the second incorporation may be delayed until the following spring. For spring applications, the second incorporation may be done immediately or delayed for several days.

*Application on granular fertilizer*

To apply with dry urea fertilizer, commercial blending is recommended. The liquid formulation of Avadex BW is sprayed onto the urea in a rotary blender. A minimum of 60 kg/acre of dry urea fertilizer must be used. Apply as soon as possible after blending. If a spin spreader is used, 100 per cent overlap is required. Do not mix with nitrate fertilizers as the mixture may explode.

## *Dual*

For incorporation of Dual ensure that the chemical remains in the top two inches (five cm) of soil only. To do so, use (1) tandem discs set to cut to a depth of four inches (10 cm) operated at six to 10 km/h (five to six mph) or (2) S-tine (Danish) cultivators with tines on six to eight inch (15 to 20 cm) centres set four inches (10 cm) deep and operated at 10 to 13 km/h (six to seven mph) or (3) vibrating shank cultivators with overlapping sweeps set to cut four inches (10 cm) deep followed by a harrow or levelling device which extends beyond the end of the implement. Immediate incorporation is not necessary.

## *Edge*

Edge DF must be incorporated into soil that is free of lumps or trash. Prior to application, work the soil until it is relatively free of lumps or trash (75 per cent black when viewed from above). A disc-type implement provides the best results. Do not use a plough as this implement may bury weed seeds below the treated area.

Edge Granular must be applied and incorporated between September 1 and freeze-up.

After application of Edge DF or Edge Granular, work the product into the soil in two different directions. Use a discer or field-cultivator (vibrating shank type) for both operations. Do not use a deep tillage cultivator, chisel plough, hoe drill, rod weeder or harrows for incorporating the product. Set the implement to work the soil at 3 to 4 inches (8 to 10 cm) depth and travel at speeds of 7 to 10 km/hr (4 to 6 mph) for discers, 10 to 13 km/hr (6 to 7 mph) for cultivators. The first incorporation must be done within 24 hours of application. If using Edge DF, the second incorporation must be performed at right angles to the first and may be performed at any time up until seeding. If using Edge Granular, delay the second incorporation for at least three days after the first. This will allow greater release of the product onto soil particles and assure more even distribution.

If using Edge Granular in the fall, both incorporations must be completed in the fall. Fall application of Edge Granular is not recommended on soils prone to erosion because the two required incorporations leave soils vulnerable to erosion.

*Application on Granular Fertilizer*

Edge DF is registered for application using dry granular fertilizer as a carrier. To apply to dry granular fertilizer, commercial blending is recommended. Edge DF should be made into a slurry consisting of 2 L of water per kg of product. This slurry is then sprayed onto the fertilizer as it is mixing in the blender. A minimum of 132 kg/acre of fertilizer must be used if spring applied and a minimum of 100 kg/acre of fertilizer must be used if fall applied. Apply as soon as possible after blending using a properly calibrated granular fertilizer spreader. Incorporate once within 24 hours and wait at least 6 days prior to incorporating the second time. Do not mix with nitrate fertilizers as this mixture could explode. If a fertilizer spin spreader is used, calibrate and apply using 100 per cent overlap to ensure even distribution.

## Eptam 8-E

Since Eptam formulations are highly volatile, the product must be incorporated immediately (preferably in the same operation) into a dry soil. This can be accomplished by mounting the spraying equipment onto the incorporation implement. Best results are achieved with use of power-driven cultivation equipment, tandem discs, and field cultivators (on light soils). Set implements to cut to a depth of four to six inches (10 to 15 cm). Power-driven equipment (rotovators) should be set to cut at two to three inches (five to 7.5 cm). Operate discers at 6.5 to 9.5 km/h (four to six mph) and cultivators at 9.5 km/h (six mph) or more. A second operation at right angles to the first is required when using discs or cultivators. Only one incorporation is necessary when using a rotovator. Incorporation with discs or cultivator should be followed by a harrow or levelling device.

*Application on granular fertilizer*

Dry bulk fertilizers (except nitrate fertilizers) may be impregnated or coated with Eptam 8-E. The Eptam 8-E should be uniformly spread onto the dry bulk fertilizer during the blending process. A minimum rate of 80 kg/acre of fertilizer is necessary to ensure adequate distribution. The impregnated fertilizer should be spread uniformly onto the field using a double overlap pattern immediately after impregnation. The impregnated fertilizer must be applied to the field when the soil surface is dry to at least one half inch (1.5 cm) depth. The first incorporation must be done immediately after application.

## Eradicane and Sutan + (also mixes with Aatrex, Atrazine or Bladex)

Since Eradicane and Sutan + formulations are highly volatile, the product must be incorporated immediately (preferably in the same operation) into a dry soil. This can be accomplished by mounting the spraying equipment onto the incorporation implement. Best results are achieved with use of power-driven cultivation equipment, tandem discs, and field cultivators (on light soils). Set implements to cut to a depth of four to six inches (10 to 15 cm). Power-driven equipment (rotovators) should be set to cut at two to three inches (five to 7.5 cm). Operate discers at 6.5 to 9.5 km/h (four to six mph) and cultivators at 9.5 km/h (six mph) or more. A second operation at right angles to the first is required when using discs or cultivators. Only one incorporation is necessary when using a rotovator. Incorporation with discs or cultivator should be followed by a harrow or levelling device.

*Application on Granular Fertilizer*

Dry bulk fertilizers except nitrate fertilizers may be impregnated or coated with Eradicane or Sutan +. The Eradicane or Sutan + should be uniformly spread onto the dry bulk fertilizer during the blending process. A minimum rate of 80 kg/acre of fertilizer is necessary to ensure adequate distribution. The impregnated fertilizer should be spread uniformly onto the field using a double overlap pattern immediately after impregnation. The impregnated fertilizer must be applied to the field when the soil surface is dry to at least 0.5 inch (1.5 cm). The first incorporation must be done immediately after application.

## Fortress

Apply and incorporate in the fall between September 15 and freeze-up or apply in the spring prior to seeding the crop. Two incorporations are required at right angles to one another to ensure even distribution of the product. For fall application the first incorporation must be completed within 24 hours of application. The second may be done either during the fall or the following spring. If performing the second incorporation in the fall, allow at least three days delay between the first and second incorporation. If the second incorporation is delayed until spring, it may be performed either before or after seeding. If performed after seeding it must be completed prior to emergence of the crop, with harrows.

For spring application, the first incorporation must be completed within 24 hours and prior to seeding of the crop. The second incorporation must be delayed at least 48 hours after the first and may be performed any time until crop emergence. If the second incorporation is conducted after seeding it should be done with a harrow or other suitable tillage equipment adjusted so as not to disturb the seed. If ridging is a problem after seeding, one harrowing is recommended to eliminate the ridging and ensure uniform distribution of the herbicide.

Incorporate no deeper than two inches (five cm) to prevent crop injury and reduction of weed control. To do this, set tillage implements (cultivator or discer) to cut three inches (7.5 cm) into the soil.

Harrowing will not provide adequate incorporation if the teeth do not penetrate the soil due to compaction or excessive surface trash.

## Nortron

Incorporate Nortron to a depth of one to two inches (2.5 to five cm) using power or ground-driven rotary tillers, rolling cultivators or harrows. Band application is preferable as carryover into the following season will be reduced. When tank mixed with Ro-Neet, follow instructions for incorporating Ro-Neet in the *Herbicide Incorporation* section.

## Primextra

Ensure that Primextra remains in the top two inches (five cm) of soil only. To do so, use (1) tandem discs set to cut to a depth of four inches (10 cm) operated at six to 10 km/h (five to six mph), or (2) S-tine (Danish) cultivators with tines on six to eight inches (15 to 20 cm) centers set four inches (10 cm) deep and operated at 10 to 13 km/h (six to seven mph), or (3) vibrating shank cultivators with overlapping sweeps set to cut four inches (10 cm) deep operated at 10 to 13 km/h (six to seven mph). Follow this operation by a harrow or levelling device which extends beyond the end of the implement. Immediate incorporation is not necessary.

## Rival, Rival 10 G, Treflan EC, Treflan QR 5, Triflurex

*Post plant but prior to emergence* (wheat and barley).

Only the liquid formulations are recommended for use as post planting, preemergence treatments in wheat or barley. Liquids should be applied and incorporated in the spring just after seeding. Incorporate to a shallow depth into a trash free soil (80% black when viewed from above) using diamond or tyne harrows operated at a speed of eight km/h (five mph). Incorporate twice, with the second incorporation at right angles to the first. The first incorporation should be performed immediately. Both incorporations should be done within 24 hours of application. When tank mixing Rival or Treflan with Avadex BW, follow the same incorporation procedure as outlined above.

*Preplant incorporated* (wheat, barley and labelled broadleaf crops).

Granular formulations are recommended for use in fall or spring as a preplant incorporated treatment on labelled broadleaf crops. The liquid formulations should be used only on soils free of lumps and relatively trash-free (75% black) and are recommended only for spring use. Do not use liquid formulations of trifluralin as a preplant incorporated treatment in wheat or barley, as severe injury will result. Only the fall applications of Rival 10 G or Treflan QR 5 are registered for use as preplant incorporated treatments in wheat or barley.

For fall application of granular formulations, work the chemical into the soil between September 1 and freeze-up. Use a discer or field cultivator (vibrating shank-type). Disc implements are preferred on stubble. Set equipment to cut at three to four inches (eight to 10 cm) depth for the first incorporation. The initial incorporation should be done within 24 hours of application. The second incorporation should be done at right angles to the first. The second incorporation may be delayed until spring, except when planning to plant barley, flax or lentils. For use in flax, lentils or barley both incorporations must be done in fall. Delay the second incorporation for three days with Treflan QR5 and five days for Rival 10G after the first to achieve better weed control. This will allow greater release of the chemical onto soil particles and assure more even distribution. Fall applications of Rival 10 G or Treflan QR 5 on flax, lentils or barley is not recommended on soils prone to erosion as the two fall incorporations necessary in these crops may leave soils vulnerable to wind or water erosion.

For spring application and incorporation of Rival, Treflan or Triflurex work the chemical into the soil prior to seeding by setting the implement at three to four inches (eight to 10 cm) cutting depth. The first incorporation must be done within 24 hours of application. The second incorporation must be done at right angles to the first. If incorporating Rival 10 G or Treflan QR 5, delay the second incorporation for three days after the first to achieve better weed control.

*Application on Granular Fertilizer*

To apply on dry bulk fertilizer, commercial blending is recommended. Treflan EC should be sprayed onto the fertilizer in a rotary blender. A minimum of 132 kg/acre of fertilizer must be used if spring applied and a minimum of 100 kg/acre of fertilizer must be used if fall applied. Apply as soon as possible after blending. Incorporate once within 24 hours and wait at least 6 days prior to incorporating the second time. If a spin spreader is used for application, calibrate and apply using 100 per cent overlaps to get even coverage. Do not mix with ammonium nitrate as the mixture may explode.

## Ro-Neet

Thoroughly incorporate Ro-Neet into the soil to a depth of two to three inches (five to 7.5 cm) within minutes of application. For broadcast application, use either a hooded power-driven rotovator or a disc implement. Set discs to cut at four to six inches (10 to 15 cm) depths. Disc twice at right angles. On light soils, disc once and harrow at right angles. For band application, incorporate two to three inches (five to 7.5 cm) using a power or ground-driven rotary tiller. The treated area should be rolled firmly between the incorporation unit and the planters.

## TABLE 20 — PRODUCT REQUIRED FOR VARIOUS ATRAZINE FORMULATIONS

***Atrazine recommendations are based on liquid formulations containing 500 g/L atrazine and wettable powder formulations containing 90 percent atrazine. Use the following chart to determine equivalent rates of other formulations.***

| | | ACTIVE RATE (kg/ac) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **PRODUCT NAME** | **CONCENTRATION** | **0.5** | **0.6** | **0.7** | **0.8** | **0.91** | **1.0** | **1.1** | **1.2** | **1.3** | **1.37** |
| Aatrex Liquid<br>Atrazine Liquid<br>Liquid Atrazine | 500 g/L | 1.0 L/ac | 1.2 L/ac | 1.4 L/ac | 1.6 L/ac | 1.82 L/ac | 2.0 L/ac | 2.2 L/ac | 2.4 L/ac | 2.6 L/ac | 2.73 L/ac |
| Atrazine 600 | 600 g/L | 0.83 L/ac | 1.0 L/ac | 1.2 L/ac | 1.3 L/ac | 1.5 L/ac | 1.7 L/ac | 1.8 L/ac | 2.0 L/ac | 2.2 L/ac | 2.3 L/ac |
| Atrazine 80 W | 80% | 0.625 kg/ac | 0.75 kg/ac | 0.875 kg/ac | 1.0 kg/ac | 1.14 kg/ac | 1.25 kg/ac | 1.38 kg/ac | 1.5 kg/ac | 1.63 kg/ac | 1.71 kg/ac |
| Aatrex Nine-0<br>Aatrex 90 W | 90% | 0.556 kg/ac | 0.667 kg/ac | 0.777 kg/ac | 0.889 kg/ac | 1.01 kg/ac | 1.1 kg/ac | 1.2 kg/ac | 1.3 kg/ac | 1.4 kg/ac | 1.52 kg/ac |

## TABLE 21 PRODUCT VOLUME REQUIRED FOR VARIOUS MCPA OR 2,4-D FORMULATIONS

*MCPA and 2,4-D recommendations are based on formulations containing 500 g/L MCPA or 2,4-D. Where other concentrations are to be used, locate the volume of 500 g/L formulation recommended and read across to the concentration being used. Do not substitute amine or ester formulations where the other formulation is specified.*

*Litres per acre (L/acre)* unless otherwise indicated.*

| **ACTIVE RATE** | CONCENTRATION (g/L) | | | | | | |
|---|---|---|---|---|---|---|---|
| **kg/ac** | **250** | **300** | **400** | **470-500** | **600** | **700** | **800** |
| 0.112 | 0.448 | 0.373 | 0.28 | 0.224 | 0.187 | 0.160 | 0.140 |
| 0.141 | 0.564 | 0.470 | 0.353 | 0.282 | 0.235 | 0.202 | 0.176 |
| 0.223 | 0.892 | 0.743 | 0.558 | 0.446 | 0.372 | 0.319 | 0.279 |
| 0.255 | 1.02 | 0.850 | 0.638 | 0.510 | 0.425 | 0.365 | 0.319 |
| 0.305 | 1.22 | 1.02 | 0.763 | 0.610 | 0.508 | 0.436 | 0.381 |
| 0.345 | 1.38 | 1.15 | 0.863 | 0.690 | 0.575 | 0.493 | 0.431 |
| 0.455 | 1.82 | 1.52 | 1.14 | 0.910 | 0.758 | 0.651 | 0.569 |
| 0.5 | 2.00 | 1.67 | 1.25 | 1.0 | 0.833 | 0.715 | 0.625 |
| 0.6 | 2.4 | 2.00 | 1.5 | 1.2 | 1.00 | 0.857 | 0.75 |
| 0.7 | 2.8 | 2.33 | 1.75 | 1.4 | 1.17 | 1.0 | 0.875 |
| 0.8 | 3.2 | 2.67 | 2.0 | 1.6 | 1.33 | 1.14 | 1.0 |
| 0.91 | 3.64 | 3.03 | 2.28 | 1.82 | 1.52 | 1.30 | 1.14 |
| 1.0 | 4.0 | 3.33 | 2.5 | 2.0 | 1.67 | 1.43 | 1.25 |
| 1.2 | 4.8 | 4.0 | 3.0 | 2.4 | 2.0 | 1.72 | 1.5 |
| 1.5 | 6.0 | 5.0 | 3.75 | 3.0 | 2.5 | 2.15 | 1.875 |
| 1.82 | 7.28 | 6.07 | 4.55 | 3.64 | 3.03 | 2.60 | 2.275 |
| 2.0 | 8.0 | 6.66 | 5.0 | 4.0 | 3.33 | 2.86 | 2.5 |

*1 L/ac = 1000 mL/ac

## *Tank Mixes*

A tank mix involves the purchase of two chemicals separately and mixing them in the sprayer tank, as opposed to a mixture formulated by the manufacturer. For example, herbicides are frequently tank mixed with other herbicides, insecticides or fertilizers. This reduces the time and cost associated with making separate passes on a field.

But the decision as to whether or not to tank mix products should be weighed carefully. The advantage and convenience of tank mixing can be easily lost if it causes lost weed control, crop injury or leads to precipitation of products to the bottom of the spray tank. Even worse, some herbicide/fertilizer mixes are explosive.

To avoid problems associated with tank mixing, follow these guidelines:

- **Use only registered tank mixes.** Registered mixes have been assessed for crop safety, weed control efficacy and compatibility. Directions or cautions are provided on the label as to how to avoid or reduce problems with registered mixes.
- **Watch for environmental cautions.** Tank mixing registered products may not result in crop injury or lost weed control under one set of weather conditions, but may under another. For example, tank mixing broadleaf weed herbicides with some grasskillers will cause reductions in grass control. These reductions may be worse under some weather conditions than others. The herbicide label will indicate whether there are some environmental conditions to avoid.
- **Check the weed stage.** Whether mixing herbicides with other herbicides, or herbicides with insecticides, all target species must be in the stages recommended for the individual products you are using. For example, grassy weeds and broadleaf weeds must both be in the stage ranges recommended for the grasskiller and broadleaf weed herbicide you intend to mix. If either the crop or the weeds are not in the correct stage of application for both products, use split applications rather than a tank mix.
- **Mix products in the order outlined on the herbicide label.** Adding herbicides to the tank in the correct order is critical in avoiding physical incompatibility and the resultant clogging of nozzles, filters and lines. When mixing, always add the first herbicide when the tank already has water in it. Agitate thoroughly before adding the second herbicide. Follow label recommendations for any additives needed.
- **Test compatibility of liquid fertilizer/herbicide mixes.** Some herbicides can be mixed with liquid fertilizers. But because liquid fertilizers vary in composition from batch to batch, you must test the compatibility of these products before mixing them in a herbicide tank. Compatibility tests usually involve putting small amounts of herbicide and liquid fertilizer into a jar to make sure they will mix. Exact instructions are given on product labels, where this type of use is registered.

## TABLE 22. GRAZING AND FEEDING RESTRICTIONS

This table summarizes label restrictions for herbicides recommended for cereal or forage crops. Consult product labels for specific information and for other crops.

| PRODUCT | RESTRICTION |
|---|---|
| ***Afolan F/Lorox/Linuron 400 L*** | Do not graze or feed green plants to livestock. |
| ***Ally*** | No restrictions. |
| ***Amitrol T*** | Do not graze pastures for 6 months, cropland for 8 months. |
| ***Assert*** | Do not graze or feed as silage or hay. |
| ***Avadex BW*** | *Annual crops.* Do not graze or feed as silage or hay.<br>*Forage legumes* Do not harvest as forage in the year of seeding. |
| ***Avenge 280 C*** | Do not graze or feed cereals for eight weeks after treatment. If cereals are undersown with forages, do not graze or feed to livestock in year of seeding. |
| ***Banvel*** | *Cereals* Do not graze or harvest for livestock feed prior to crop maturity.<br>*Pasture and forages* Do not graze or feed *dairy animals* within seven to 60 days of treatment, depending on rate of Banvel applied. See product label for additional detail. Do not graze or feed *slaughter animals* within 30 days of treatment. Forage harvested within 30 days of treatment should not be fed to slaughter animals within 30 days of slaughter.<br>There is no restriction for livestock other than dairy or slaughter animals. |
| ***Basagran*** | Do not graze or harvest for livestock feed. |
| ***Blagal*** | Do not graze or feed green plants to livestock. |
| ***Buctril M/Pardner*** | *Annual crops:* Do not graze or harvest treated crops for feed. *Perennial forage grasses:* Do not graze or harvest treated forages in the year of treatment. |
| ***Carbyne*** | Do not graze within 5 weeks of treatment. Do not feed the lower 3.5 inches (8 cm) of pea vines. |
| ***DyVel*** | Do not graze or harvest for livestock feed prior to crop maturity. |
| ***Edge DF/Edge Granular*** | Do not graze or harvest for livestock feed prior to crop maturity. |
| ***Embutox 625/ Cobutox/2,4-D Butyric 400*** | Do not graze or feed treated crop in the year of treatment. |
| ***Eptam*** | Do not graze or feed treated crops to livestock. |
| ***Estaprop/Diphenoprop 600*** | Do not harvest for feed within 28 days of treatment. |
| ***Excel*** | Do not graze or harvest for feed. |
| ***Fortress*** | Do not graze or feed to livestock. |
| ***Fusilade*** | Do not graze or harvest for livestock feed in the year of treatment. |
| ***Glean*** | No restrictions. |
| ***Hoe-Grass 284*** | Do not graze treated cereal crops prior to crop maturity. Do not graze treated forages in the year of treatment. Do not graze sainfoin or alsike clover for the life of the stand. |
| ***Hoe-Grass II*** | Do not graze treated fields prior to crop maturity. |
| ***Kerb*** | Do not harvest or graze within 60 days after application. |
| ***Kil-Mor*** | Do not graze or use for livestock feed within seven days of application. |
| ***Laredo/Roundup/Wrangler*** | Do not graze treated areas. |
| ***Laser*** | Do not graze treated fields prior to harvest. |
| ***Lexone / Sencor*** | Do not graze or feed treated cereal crops within 30 days of application, or peas within 70 days after application. |
| ***Lontrel*** | Do not graze or feed crops treated with Lontrel. |
| ***Marksman*** | Do not graze cattle or harvest for silage until at least 12 weeks following treatment. |

| PRODUCT | RESTRICTION |
|---|---|
| *Mataven L* | Do not graze or feed treated wheat before maturity. Straw can be used for bedding or feed after harvest of the crop. Do not graze or harvest forage grasses or legumes for feed in the year of treatment. |
| *MCPA* | Do not graze dairy cattle within seven days of spraying. |
| *MCPP* | Do not graze or harvest for livestock feed. |
| *Poast* | Do not graze treated fields or harvest for feed prior to crop maturity. |
| *Princep Nine-T/Simazine 80 WP* | Do not graze for 30 days or cut for hay within 60 days of application. |
| *Refine* | Do not graze or feed treated crop within 7 days of application. |
| *Reglone* | Do not graze or harvest for livestock feed in year of treatment. |
| *Rival/Treflan/Triflurex* | Do not graze or harvest for livestock feed in year of treatment. |
| *Sinbar* | None |
| *Stampede 360/Stampede CM* | Do not graze or harvest for livestock feed prior to crop maturity. |
| *Target* | Do not graze or use for livestock feed within seven days of application. |
| *TCA* | Do not graze treated areas for at least 24 hours. Do not feed treated beet tops. |
| *Tordon 202 C* | Do not feed treated plant material to meat animals being finished for slaughter, or to dairy animals within 14 days of treatment. See label for precautions on use of manure when treated crop is fed. |
| *Tropotox Plus* | Do not graze or harvest for livestock feed in year of treatment. |
| *2,4-D* | Do not graze for 24 hours after treatment. |

## TABLE 23 EFFECT OF RAINFALL ON HERBICIDE EFFICACY

**Rainfall shortly after application of a postemergence herbicide may reduce weed control. Effect will vary with the product, the interval between spraying and rainfall and the amount and duration of rainfall. The following guidelines are based on label information and additional detail supplied by the chemical industry. Use the longest time interval when considering tank mixes.**

| INTERVAL REQUIRED | PRODUCT | |
|---|---|---|
| 15 minutes | Carbyne 2 EC | |
| 1 hour | Buctril M | Cobutox |
| | Hoe-Grass 284 | 2,4-D Butyric 400 |
| | Hoe-Grass II | Embutox 625 |
| | Pardner | Poast |
| | TCA | |
| 2 hours | Atrazine | |
| | Bladex L | |
| | Fusilade | |
| | Mataven L | |
| | MCPA ester | |
| | Torch DS | |
| | 2,4-D ester | |
| 3 hours | Assert 300 LC | |
| | Target | |
| | Estemine 2,4-D | |
| | Estemine MCPA | |
| | Excel | |
| | Laser | |
| 4 hours | Blagal | Stampede 360 |
| | Linuron 400 L | Stampede CM |
| | MCPA amine | Tropotox Plus |
| | 2,4-D amine | |
| 6 hours | Amitrol-T | MCPAK |
| | Avenge 280 C | MCPA Sodium Salt |
| | Betanex | Refine |
| | Kil-Mor | Roundup |
| | Laredo | Sencor |
| | Lexone | Tordon 202C |
| | Lontrel | Wrangler |
| 8 hours | Basagran | |
| | Laddock | |
| No information provided on the effects of rainfall on herbicide efficacy by the manufacturer. To ensure no reduction in control allow an 8 hour interval between application and rainfall. | Afolan F + MCPA | Estaprop |
| | Banvel | Garlon |
| | Diphenoprop 600 | Lorox + MCPA |
| | DyVel | Mecoprop |

## TABLE 24 – SOIL RESIDUES SUMMARY

Several herbicides recommended for field or forage crops leave a residue in the soil, affecting subsequent crops in the rotation. This table summarizes available information. Product labels provide specific information. **Herbicides applied in the fall or on summerfallow may also leave a residue in the soil (example, high rates of Banvel, Tordon 22 K).** Check recommendations or product labels for precautions.

<table>
<tr><th>PRODUCT</th><th>CROPS WHICH MAY BE AFFECTED THE YEAR FOLLOWING USE OF THE HERBICIDE</th></tr>
<tr><td><b>Ally</b></td><td>The persistence of Ally and the effects of this herbicide on succeeding crops is unpredictable. The following recropping intervals based on soil pH should be considered as guidelines only. Ally residues may affect crops for a longer period of time than outlined in the Table below. Add 12 months to recommendations if less than 10 inches (250 mm) rainfall in any year following application.
<table>
<tr><th></th><th colspan="4">Minimum Recropping Interval (Months)</th></tr>
<tr><th>Soil pH</th><th>Spring and Durum Wheat, Barley, Oats</th><th>Rapeseed, Flax</th><th>Alfalfa, Peas, Red Clover</th><th>Lentils</th></tr>
<tr><td><b>6.9 or lower</b></td><td>10</td><td>10</td><td>22</td><td>34</td></tr>
<tr><td><b>7.0 to 7.5</b></td><td>10</td><td>22</td><td>22</td><td>48</td></tr>
<tr><td><b>Above 7.5</b></td><td colspan="4">No information</td></tr>
</table>
Although growing test strips of sensitive crops may give some indication of whether it is safe to rotate to other crops, yield losses within the test strip may not be noticed unless yield can be compared to an untreated area seeded adjacent to the Ally treated strip. Refer to the soil pH section for additional information on soil pH and its measurement.</td></tr>
<tr><td><b><i>Assert</i></b></td><td>Rotate only to spring wheat (including durum), barley, canola or sunflower the year after application in the black and grey wooded soil zones. Residual carryover two years or more after application has not been fully evaluated on other crops. Growing test strips of sensitive crops may give some indication as to whether it is safe to rotate into other crops. However, yield losses within the test strips may not be noticed unless yield can be compared to an untreated area seeded adjacent to the Assert treated strip.</td></tr>
<tr><td><b>Atrazine</b> <i>(includes all products containing atrazine)</i></td><td>All crops except corn and triazine tolerant canola. Peas, flax and faba beans have some tolerance to atrazine residues. If rate of application exceeds 0.445 kg/acre of active ingredient, only corn or triazine tolerant canola should be grown the following year. Atrazine residues may persist for more than one year.</td></tr>
<tr><td><b>Avadex BW</b></td><td>Oats</td></tr>
<tr><td><b>Bladex</b></td><td>All crops except corn, triazine tolerant canola, cereals, potatoes, flax, rapeseed (canola), sunflowers, soybeans or peas. There is no recropping restriction at the rates recommended for use in triazine tolerant canola.</td></tr>
<tr><td><b>Devrinol 50-WP</b></td><td>Plant only raspberries or strawberries within 12 months of treatment.</td></tr>
<tr><td><b>Edge</b></td><td>Sugar beets, canary seed, timothy, and other small seeded grasses.</td></tr>
<tr><td><b>Fortress</b></td><td>Oats, sugar beets, small-seeded grasses may be damaged when grown the year after application of Fortress.</td></tr>
</table>

<table>
<thead>
<tr><th>PRODUCT</th><th>CROPS WHICH MAY BE AFFECTED THE YEAR FOLLOWING USE OF THE HERBICIDE</th></tr>
</thead>
<tbody>
<tr><td><b>Glean</b></td><td>The persistence of Glean and its effects on succeeding crops is unpredictable. The following recropping intervals should be considered as guidelines only. Add 12 months to recommendations if less than 10 inches (250 mm) rain falls in any year following application.
<table>
<tr><th></th><th colspan="6">Minimum Interval Prior to Planting (Months)</th></tr>
<tr><th>Soil pH</th><th>Spring and Winter Wheat</th><th>Durum Wheat</th><th>Barley, Oats</th><th>Rapeseed</th><th>Peas</th><th>Flax, Lentils</th></tr>
<tr><td><b>Less than 7.0</b></td><td>2</td><td>10</td><td>10</td><td>22</td><td>34</td><td>48</td></tr>
<tr><td><b>7.1 to 7.5</b></td><td>2</td><td>10</td><td>22</td><td>34</td><td>*</td><td>*</td></tr>
<tr><td><b>Above 7.5</b></td><td>*</td><td>*</td><td>*</td><td>*</td><td>*</td><td>*</td></tr>
</table>
*No information available.<br>Although growing test strips of sensitive crops may give some indication of whether it is safe to rotate to other crops, yield losses within the test strips may not be noticed unless yield can be compared to an untreated area seeded adjacent to the Glean treated strip. Refer to the soil pH section for additional information on soil pH and its measurement.</td></tr>
<tr><td><b>Lontrel</b></td><td>Replant to wheat, oats, barley, rye, flax or rapeseed. Do not sow lentils or potatoes into fields treated with Lontrel until the third growing season after the year of treatment.</td></tr>
<tr><td><b>Primextra</b></td><td>All crops except corn and triazine tolerant canola. Primextra contains atrazine. See comment for atrazine.</td></tr>
<tr><td><b>Princep Nine-T,<br>Simazine</b></td><td>All crops except established forage legumes where recommended. Soil residues may persist for two or more years.</td></tr>
<tr><td><b>Rival/Treflan/<br>Triflurex</b></td><td>Sugar beets, red beets, oats, fall rye, canaryseed, small-seeded grasses. Corn is sensitive at higher rates of application. Damage to wheat can occur if the crop is seeded into land which has been treated during the previous 21 months with Rival, Treflan or Triflurex and which has received abnormally low amounts of precipitation. Damage is worse if conditions are not conducive to rapid emergence of the wheat (i.e. if the crop is seeded deep, if soil conditions remain cool during emergence). Damage tends to be greater on fields treated with granular formulations.</td></tr>
<tr><td><b>Sencor / Lexone</b> <i>(preplant recommendations)</i></td><td>Rapeseed, sunflowers, sugar beets, onions, celery, peppers, cole crops, lettuce, spinach, red beets, turnips, pumpkin, squash, cucumbers and melons. Fall seeded crops may also be injured when seeded within the same season as the application of Sencor or Lexone.</td></tr>
<tr><td><b>Sinbar</b></td><td>All crops except established alfalfa as recommended. Sinbar residues may persist for two or more years.</td></tr>
<tr><td><b>Tordon 202 C</b></td><td>Replant to wheat, barley, oats, flax or rapeseed for two years following treatment. Do not plant fields treated with Tordon 202 C to alfalfa or sunflowers until at least the third growing season after the year of treatment, or beans, lentils, peas or potatoes until at least the fifth growing season after the year of treatment. Due to the length of the recropping restriction, the use of Tordon 202 C in Manitoba is not recommended on farms where vegetable crops, pulse crops or forage legumes are included in the crop rotation.</td></tr>
</tbody>
</table>

## TABLE 25. WINTER STORAGE OF HERBICIDES

### Heated storage

*Herbicides which must be kept in heated storage (DO NOT FREEZE)*

Agricultural Weedkiller No. 1
Afolan F
Alanap 3
Amiben
Amitrol-T
Amizine
Atra-Mix
Avadex BW Liquid
Basagran
Betasan
Bladex Liquid
Bladex TTC
Carbyne
Chipman Dandelion Killer
Chipman Lawn Weed Killer
Chipman Premium Lawn Killer
Compitox
Compitox Plus
Co-op Lawn Weed Killer
Co-op Premium Lawn Weed Killer
Co-op Premium Spot Weed Killer
Co-op Premium Turf Herbicide
Dyanap
Dycleer 24
DyVel
Embark
Estemines (2,4-D, MCPA)
Excel
Esteron 600
Esteron LV-600
Esteron 99
Formula 40C
Garlon
Gramoxone
Gramoxone S
Hoe-Grass 284
Hoe-Grass II
Killex
Kil-mor
Laddok
Laser
Linuron 400L
Lontrel
Lorox L
Mataven L
MCPA - amines
  potassium and sodium salts
Mecoprop 300
Mecoturf
Mecoturf Plus 2,4-D
Nortron
Phenoxylene Plus
Prefar
Reglone
Reglone A
Rival
Re-Neet 7.2E
Sweep
Target
Tordon 22K
Tordon 101
Tordon 202C
Treflan EC
Tropotox Plus
2,4-D amine
Weed-No-More
Weed-No-More

### Storage at freezing temperatures

*Herbicides which may be stored at freezing temperatures. These must be returned to their original state by allowing them to warm to room temperature, 20 to 22° C (68 to 72° F), and agitating thoroughly before use.*

AAtrex Liquid
AAtrex Plus
Assert 300 LC
Atrazine Liquid
Avenge 280C
Banvel
Betamix
Betanex
Blagal
Buctril M
Cobutox
Co-op Atrazine 5L
Desormone
Diphenoprop 600
Diphenoprop 700
DyCleer
Dual
Embutox 625
Eptam 8E
Eradicane 8-E
Estaprop
Fusilade
Laredo
Lexone L
MCPA Esters
Marksman
Pardner
Poast
Primextra
Propaturf
Roundup
See 2,4-D
Sencor 500
Silvaprop
Sutan +
Stampede 360
Stampede CM
Triflurex
Wrangler
2,4-D Butyric 400
2,4-D Ester

*Herbicides normally sold as granules or powders: (These are not usually damaged by freezing.) Store in a dry place.*

AAtrex 90 WP
AAtrex Nine-0
Allizol
Ally
Atra-pell
Atrazine 80W
Avadex Granules
Bar-fox
Betasan 12.5G
Bladex 80W
Casoron 4G
Co-op Garden Weed Preventer
Co-op Total Vegetation Control
Co-op Weedrite Granules
Dacthal W75
Devrinol 50-WP
Edge DF
Edge Granular
Enide
Eramox 80W
Fortress
Glean
Hoe-No-More
Kerb 50-W
Krovar I
Lexone DF
NaTA TCA
No-Hoe
Primatol 80WP
Primatol 5:5G
Princep Nine-T
Princep 4G
Refine
Rival 10G
Sencor 75 DF
Simmaprim 80W
Sinbar
Spike 80WP
Spike 5G
Tenoran 50W
Treflan QR5
Weedrite

## TABLE 26 — HERBICIDE CONCENTRATION AND MANUFACTURERS

SYMBOLS: **EC** – emulsifiable concentrate
**F** – flowable
**G** – granular
**SN** – solution
**P** – pellets
**WDG** – water dispersible granule
**WP** – wettable powder
**WSP** – water soluble powder
**g/L** – grams/litre

| TRADE NAME | GENERIC NAME | ACTIVE INGREDIENT AND FORMULATION | MANUFACTURER |
|---|---|---|---|
| Aatrex (for agricultural use) | Atrazine | 480 g/L F<br>90% WP | Ciba-Geigy |
| Aatrex-Nine-0 | Atrazine | 90% WDG | Ciba-Geigy, Interprovincial Co-op |
| Aatrex-Plus | Atrazine + petroleum oil | 400 g/L F | Ciba-Geigy |
| Ally | Metsulfuron Methyl | 60% DF | DuPont Canada Inc. |
| Afolan F | Linuron | 450 g/L F | Hoechst |
| Alanap 3 | Naptalam | 240 g/L EC | Uniroyal Chemical |
| Agricultural Weedkiller No. 1 | mineral oil 100%<br>aromatics 13-24% | 100% SN | Ciba-Geigy |
| Allizol | amitrole | 95% WSP | Rhone Poulenc |
| Amiben | Chloramben | 240 g/L SN | Rhone Poulenc |
| Amitrol-T | Amitrole | 200 g/L SN | Rhone Poulenc |
| Amizine | Amitrole + Simazine<br>106 g/L + 53 g/L | 159 g/L SN | Rhone Poulenc |
| Assert 300LC | Imazamethabenz | 300 g/L SN | Cyanamid Canada Inc. |
| Atra-Mix | Atrazine + petroleum oil | 400 g/L F | ICI Chipman |
| Atra-pell | atrazine + 2,4-D (1:1) | 10% G | Tam O'Shanter Industries Ltd. |
| Atrazine | Atrazine | 80% WP | ICI Chipman |
| Atrazine 480 F | Atrazine | 480 g/L F | Interprovincial Co-op |
| Atrazine 500 | Atrazine | 500 g/L F | United Agri products |
| Atrazine 600 | Atrazine | 600 g/L | Van Waters and Rogers |
| Atrazine Liquid | Atrazine | 500 g/L F | ICI Chipman |
| Avadex BW | Triallate | 400 g/L EC<br>10% G | Monsanto |
| Avenge 280C | Difenzoquat | 280 g/L SN | Cyanamid Canada Inc. |
| Banvel | Dicamba | 480 g/L SN | Sandoz Agro Canada Inc. |
| Bar-fox | TCA | 83% | Green Cross |
| Basagran | Bentazon | 480 g/L SN | BASF |
| Basamid Granular | Dazomet | 98% G | BASF |
| Betamix | Phenmedipham: Desmedipham | 150 g/L EC | Nor-Am Agri. Products Inc. |
| Betanex | Desmedipham | 150 g/L EC | Nor-Am Agri. Products Inc. |
| Betasan | Bensulide | 480 g/L EC<br>12.5% G | ICI Chipman |
| Bladex | Cyanazine | 480 g/L F<br>80% WP | Ciba-Geigy |
| Blagal | Cyanazine + MCPA (1:2) | 375 g/L F | Ciba-Geigy |
| Buctril M | Bromoxynil Octanoate + MCPA ester (280 g/L, each) | 560 g/L EC | Rhone Poulenc |
| Carbyne | Barban | 240 g/L | United Agri Products |
| Calmix Pellets | Bromacil 3% + 2,4-D acid 5% | 8% P | Rhone Poulenc |
| Casoron G-4 | Dichlobenil | 4% G | United Agri Products |
| Cobutox | 2,4-DB iso-octyl ester | 400 g/L | Interprovincial Co-op |
| Compitox | MCPP | 150 g/L SN | Rhone Poulenc |
| Compitox Plus | MCPP + 2,4-D (50%, 50%) | 200 g/L SN | Rhone Poulenc |
| Co-op Atrazine 480 F | atrazine | 480 g/L F | Interprovincial Co-op |
| Co-op Atrazine 90 WP | atrazine | 90% WP | Interprovincial Co-op |
| Co-op Garden Weed Preventer | Trifluralin | 1.47% G | Interprovincial Co-op |

| TRADE NAME | GENERIC NAME | ACTIVE INGREDIENT AND FORMULATION | MANUFACTURER |
|---|---|---|---|
| Co-op Granular Soil Sterilant | Sodium Metaborate Tetrahydrate 66.5%<br>Sodium chlorate 30%<br>Diuron 1.25% | 97.75% G | Interprovincial Co-op |
| Co-op Lawn Weed Killer | 2,4-D | 200 g/L SN | Interprovincial Co-op |
| Co-op Premium Lawn Weed Killer | 2,4-D + Mecoprop (125 g/L each) | 250 g/L SN | Interprovincial Co-op |
| Co-op Premium Spot Weed Killer | 2,4-D + Mecaprop amine (3 g/L each) | 6 g/L SN | Interprovincial Co-op |
| Co-op Premium Turf Herbicide | 2,4-D + Mecoprop (125 g/L each) | 250 g/L SN | Interprovincial Co-op |
| Co-op Sodium TCA | sodium trichloroacetic acid | 85% WSP | Interprovincial Co-op |
| Co-op Total Vegetation Control (Soil sterilant) | Sodium metaborate 68%<br>Sodium chlorate 30% | 98% G | Interprovincial Co-op |
| Co-op Weedrite granules | Paraquat 2.5%<br>Diquat 2.5% | 5% G | Interprovincial Co-op |
| Dacthal W75 | Chlordal dimethyl | 75% WP | SDS Biotech |
| Desormone 7 | Dichlorprop/2,4-D (1:1) | 700 g/L EC | Rhone Poulenc |
| Devrinol 50-WP | Napropamide | 50% | ICI Chipman |
| Diphenoprop 600 | 2,4-D/Dichlorprop (1:1) | 600 g/L EC | United Agri Products |
| Diphenoprop 700 | 2,4-D/Dichlorprop | 700 g/L EC | United Agri Products |
| Dual | Metolachlor | 960 g/L EC | Ciba-Geigy |
| Dy-Amine | 2,4-D | 500 g/L SN | United Agri Products |
| DyCleer (Industrial) | Dicamba | 480 g/L SN | Sandoz Agro Canada Inc. |
| DyCleer 24 (Industrial) | Dicamba + 2,4-D (200 g/L + 400 g/L) | 600 g/L SN | Sandoz Agro Canada Inc. |
| DyVel | Dicamba + MCPAK<br>84 g/L + 336 g/L | 420 g/L SN | Sandoz Agro Canada Inc. |
| Edge DF | Ethalfluralin | 50% WSP | Elanco |
| Edge Granular | Ethalfluralin | 5% G | Elanco |
| Embutox 625 | 2,4-DB iso-octyl ester | 625 g/L EC | Rhone Poulenc |
| Enide | Diphenamid | 50% WP | TUCO Products |
| Eptam 8-E | EPTC | 800 g/L EC | ICI Chipman |
| Eradicane 8-E | EPTC + Crop Protectant | 800 g/L EC | ICI Chipman |
| Estaprop | Dichlorprop + 2,4-D<br>300 g/L + 282 g/L | 582 g/L EC | Rhone Poulenc |
| Estemine MCPA | MCPA non volatile amine | 500 g/L SN | Ciba-Geigy |
| Estemine 2,4-D | 2,4-D non volatile amine | 500 g/L SN | Ciba-Geigy |
| Esteron 600 (Forestry) | 2,4-D low volatile ester | 600 g/L EC | Dow Chemical Canada Inc. |
| Esteron LV 600 | 2,4-D low volatile ester | 600 g/L EC | Dow Chemical Canada Inc. |
| Esteron 99 | 2,4-D low volatile ester | 500 g/L EC | Dow Chemical Canada Inc. |
| Excel | Fenoxaprop ethyl | 90 g/L | Hoechst |
| Fortress | Triallate + Trifluralin | 10% + 4% G | Monsanto |
| Fusilade | Fluazifop-butyl | 250 g/L EC | ICI Chipman |
| Garlon | Triclopyr | 480 g/L EC | Dow Chemical Inc. |
| Gramoxone | Paraquat | 200 g/L SN | ICI Chipman |
| Gramoxone S | Paraquat | 200 g/L SN | ICI Chipman |
| Herbicide 273 | Endothal | 360 g/L EC | Pennwalt Corporation |
| Hoe-Grass 284 | Diclofop methyl | 284 g/L EC | Hoechst |
| Hoe-Grass II | Diclofop methyl<br>bromoxynil (ester) | 230 g/L + 80 g/L EC | Hoechst |
| Hoe-No-More | Chloramben | 4% G | Ciba-Geigy |
| Hyvar X | Bromacil | 80% WP | DuPont Canada Inc. |
| Hyvar XL | Bromacil | 240 g/L SN | DuPont Canada Inc. |
| Karmex | Diuron | 80% WP | DuPont Canada Inc. |
| Kerb 50 W | Propyzamide | 50% WP | Rohm & Haas Canada Inc. |
| Killex (single strength) | Dicamba (9 g/L), 2,4-D (100 g/L), Mecoprop (50 g/L) | 159 g/L SN | Ciba-Geigy |

| TRADE NAME | GENERIC NAME | ACTIVE INGREDIENT AND FORMULATION | MANUFACTURER |
|---|---|---|---|
| Killex (double strength) | Dicamba (18 g/L), 2,4-D (200 g/L), Mecoprop (100 g/L) | 318 g/L SN | Ciba-Geigy |
| Kil-Mor | Dicamba (110 g/L), 2,4-D (310 g/L), Mecoprop (80 g/L) | 500 g/L SN | Ciba-Geigy |
| Krenite | Ammonium ethyl carbamoylphosphonate | 480 g/L EC | DuPont Canada Inc. |
| Krovar I | Bromacil + diuron (40% + 40%) | 80% WP | DuPont Canada Inc. |
| Laddok | Bentazon + Atrazine (200 g/L each) | 400 g/L F | BASF |
| Laredo | Glyphosate | 356 g/L SN | United Agri Products |
| Laser | Fenoxaprop-Ethyl (28 g/L) + Bromoxynil (112 g/L) + MCPA (112 g/L) | 252 g/L EC | Hoechst |
| Lawn Saver | 2,4-D (118 g/L) + Mecoprop (125 g/L) | 243 g/L | Van Waters and Rogers |
| Lexone DF | Metribuzin | 75% DF | DuPont Canada Inc. |
| Lexone L | Metribuzin | 480 g/L F | DuPont Canada Inc. |
| Linuron 400 L | Linuron | 400 g/L F | |
| Lontrel | Clopyralid | 200 g/L EC | Dow Chemical of Canada Ltd. |
| Lorox L | Linuron | 480 g/L F | Dupont Canada Inc. |
| Marksman | Dicamba + Atrazine | 401 g/L | Sandoz Agro Canada Inc. |
| Mataven L | Flamprop methyl | 52.5 g/L EC | Dupont Canada Inc. |
| MCPA | (2-methyl-4 chlorophenoxy) acetic acid as esters amines and sodium salts | 250 g/L<br>300 g/L<br>500 g/L | See 2,4-D |
| MCPAK 400 | Potassium salt of MCPA | 400 g/L SN | Interprovincial Co-op.<br>Rhone Poulenc |
| Mecoprop 300 | MCPP | 150 g/L SN | United Agri Products |
| Mecoturf | MCPP (D-isomer) | 150 g/L SN | Rhone Poulenc |
| Mecoturf plus 2,4-D | MCPP (D-isomer), + 2,4-D 200 g/L + 200 g/L | 400 g/L SN | Rhone Poulenc |
| NaTA TCA | Sodium Trichloroacetic acid | 85% WSP | Hoechst |
| Nortron | Ethofumesate | 180 g/L EC | Fisons |
| Par II | Mecoprop, 2,4-D, Dicamba | 100 g/L, 190 g/L, 18 g/L | United Agri Products |
| Pardner | Bromoxynil | 280 g/L EC | Rhone Poulenc |
| Poast | Sethoxydim | 184 g/L EC | BASF |
| Phenoxylene Plus | MCPA (sodium potassium salts) | 250 g/L SN | Fisons |
| Prefar | Bensulide | 480 g/L EC | ICI Chipman |
| Primatrol (Industrial) | Atrazine | 80% WP<br>500 g/L F | Ciba-Geigy |
| Primatol Granular (Industrial) | Atrazine + 2,4-D (5% + 5%) | 10% G | Ciba-Geigy |
| Primextra | Metolachlor (300 g/L), Atrazine (190 g/L), Related active triazines (10 g/L) | 500 g/L F | Ciba-Geigy |
| Princep Nine-T (Agricultural) | Simazine | 90% WDG | Ciba-Geigy |
| Princep 4 G (Agricultural) | Simazine | 4% G | Ciba-Geigy |
| Propaturf | 2,4-D + dichloroprop (350 g/L) | 700 g/L EC | Rhone Poulenc |
| Refine | DPX M6316 | 75% DF | DuPont Canada Inc. |
| Reglone | Diquat | 200 g/L SN | ICI Chipman |
| Reglone A | Diquat | 200 g/L SN | ICI Chipman |
| Rival | Trifluralin | 500 g/L EC | Hoechst |
| Rival 10 G | Trifluralin | 10% G | Hoechst |
| Ro-Neet 7.2E | Cycloate | 720 g/L EC | ICI Chipman |
| Roundup | Glyphosate | 356 g/L SN | Monsanto |
| See 2,4-D | 2,4-D Ester | 450 g/L SN | United Agri Products |
| Sencor 500 | Metribuzin | 500 g/L F | Chemagro |
| Sencor 75 DF | Metribuzin | 75% DF | Chemagro |
| Sitramine 500 | 2,4-D | 480 g/L | Van Waters and Rogers |
| Simazine 80-W | Simazine | 80% WP | United Agri Products |

| TRADE NAME | GENERIC NAME | ACTIVE INGREDIENT AND FORMULATION | MANUFACTURER |
|---|---|---|---|
| Simmaprim (Industrial, Aquatic) | Simazine | 90% WP | Ciba-Geigy |
| Sinbar | Terbacil | 80% WP | DuPont Canada Inc. |
| Spike | Terbuthiuron | 80% WP<br>5% | Elanco |
| Stampede 360 | Propanil | 360 g/L SN | Rohm & Haas |
| Stampede CM | Propanil + MCPA 360 g/L + 100 g/L | 460 g/L EC | Rohm & Haas |
| Super Compitox | Mecoprop + 2,4-D | 200 g/L | Rhone Poulenc |
| Sutan + | Butylate | 800 g/L EC | ICI Chipman |
| Sweep | Paraquat | 250 g/L SN | ICI Chipman |
| Target | MCPA (275 g/L),<br>Mecoprop (62.5 g/L),<br>Dicamba (62.5 g/L) | 400 g/L SN | Ciba-Geigy |
| Tenoran | Chloroxuron | 50% WP | Ciba-Geigy |
| Tordon 22 K | Picloram | 240 g/L SN | Dow Chemical Canada Inc. |
| Tordon 101 | Picloram + 2,4-D (60 g/L + 240 g/L) | 300 g/L SN | Dow Chemical Canada Inc. |
| Tordon 202 C | Picloram + 2,4-D (1:16) | 212 g/L SN | Dow Chemical Canada Inc. |
| Treflan EC | Trifluralin | 545 g/L EC | Elanco |
| Treflan QR 5 | Trifluralin | 5% G | Elanco |
| Triflurex | Trifluralin | 400 g/L EC | Shamrock Chemicals |
| Tropotox Plus | MCPB and MCPA | 400 g/L SN | Rhone Poulenc |
| 2,4-D | 2,4-dichlorophenoxy acetic acid, low volatile esters and amines | 250 g/L,<br>300 g/L<br>500 g/L<br>600 g/L<br>800 g/L | Rhone Poulenc,<br>Interprovincial Co-op,<br>Van Waters and Rogers,<br>United Agri Products<br>Dow Chemical Canada Inc. |
| 2,4-D Butyric 400 | 2,4-DB, as mixed butyl esters | 40 g/L EC | United Agri Products |
| Vapam | Metam | 380 g/L | ICI Chipman |
| Velpar | Hexazinone | 90% WSP | DuPont Canada Inc. |
| Vorlex | Methyl iso. Thiocyanate + $C_3$ Hydrocarbons (225 g/L + 900 g/L) | 1125 g/L | NorAm |
| Weed-No-More | 2,4-D | 150 g/L SN | Ciba-Geigy |
| Weedone CB | Dichlorprop + 2,4-D (80 g/L + 80 g/L) | 160 g/L SN | Rhone Poulenc |
| Weedrite | paraquat + diquat | 5% WDG | Wilson |
| Wrangler | Glyphosate | 356 g/L SN | Van Waters and Rogers |

# Weed Control Glossary

***Abscission layer*** — separation layer that develops typically (not always) at the base of the leaf stalk, which eventually permits the leaf to fall. In some species, this layer forms even before the leaf is mature.

***Acid equivalent*** — theoretical yield of parent acid from an active ingredient. For example, the active ingredient in a 2,4,-D formulation may be 2,4-D amine or 2,4-D ester. The parent acid is the 2,4-D, and the acid equivalent is the amount of 2,4-D (acid) in the formulation. This amount is usually given as grams per litre.

***Active ingredient*** — chemical compound in a product that is responsible for the herbicidal effects.

***Adjuvant*** — ingredient which when added to a formulation or spray mixture alters the action of the active ingredient.

***Amine*** — water-soluble, non-volatile herbicide that forms a true solution in water.

***Annual*** — plant that completes its life cycle from seed in less than one year. Summer annuals begin growth in the spring and mature by fall. Winter annuals begin growth in the fall and mature the following spring or early summer.

***Authorized applicator*** — applicator having a current license under the Pesticides and Fertilizers Control Act, and approved by the Weed Control Section of Manitoba Agriculture for applying the specified product.

***Band treatment*** — herbicide applied as a narrow strip over the crop row, usually combined with inter-row cultivation.

***Biennial*** — a plant which completes its life cycle in two years. Usually a rosette is produced in the first year and in the second year it flowers, sets seed and dies.

***Compatible*** — compounds or formulations that can be mixed and applied together without undesirably altering their separate effects.

***Contact herbicide*** — herbicide that does not move within the plant and has a direct effect only on that part of the plant which is covered by the spray mixture.

***Crop protectant*** — additive to a herbicide that protects the crop against the effects of the herbicide.

***Desiccation*** — the chemically accelerated drying of plants. The ripening of the crop is more uniform.

***Directed spray*** — spray directed on weeds or soil in such a manner as to avoid contact with the crop.

***Dormant*** — resting stage similar to the condition of a plant during the winter.

***Drag-off*** — procedure of knocking down seeding hills, spraying and re-hilling prior to emergence.

***Dry flowable*** — herbicide formulation composed of small granules of active and inert ingredients for dilution in water to form a suspension. Can be measured volumetrically or by weight.

***Emergence*** — time at which the seedling first appears above the ground.

***Emulsion*** — mixture of two liquids held together by a third chemical or emulsifier (usually oil in water with an emulsifier).

***Estemine*** — specially formulated MCPA or 2,4-D amine.

***Ester*** — oil-soluble herbicide that forms an emulsion when mixed with water.

***Flowable (liquid)*** — herbicide formulation with solid particles suspended in a liquid, similar to a wettable powder in a slurry form.

***Formulation*** — type of herbicide commercially available, such as ester, amine, or sodium salt.

***Granular formulation*** — herbicide formulated by attaching it to a granular material such as clay.

***Herbicide*** — chemical which is used to destroy or inhibit growth of weeds.

***Incorporation*** — thorough mixing of a chemical into the soil to a depth recommended for the specific product.

***Low volatile ester (LV)*** — oil-soluble herbicide similar to an ester but usually less volatile because it has a longer molecular chain.

***Non-selective herbicide*** — herbicide that can be used to control plants generally without regard to species.

***Patch treatment*** — application of a herbicide to infested areas within a field.

***Perennial*** — plant that normally lives for more than two years.

***Postemergence*** — application after the crop and weeds emerge.

***Potassium salt*** — a water soluble, non-volatile herbicide that forms a true solution in water.

***Precipitate*** — a substance, usually crystalline, separated from a solution as a solid. May be formed by the interaction of two pesticides or a pesticide and water. The precipitate settles and may clog screens and filters.

***Preemergence*** — application before the crop and weeds emerge.

***Preplant*** — application before a crop is planted.

***Product*** — contents of a herbicide container as marketed.

***Resistant*** — crop not damaged by a herbicide if applied as recommended, or a weed not controlled by any practical rate of a herbicide.

***Seedling*** — refers to the early stages of growth of crop plants or weeds; technically a plant prior to the development of a root system other than the seed or seminal root.

***Selective herbicide*** — chemical used in such a manner that it will control weeds in a growing crop without damaging the crop.

***Sodium salt*** — water-soluble non-volatile herbicide that forms a true solution in water.

***Soil sterilant*** — chemical that prevents the growth of all plants for an extended period of time.

***Soluble powder*** — salt formulated as a powder and soluble in water.

***Spot treatment*** – application of a herbicide to an infestation not exceeding one acre (0.4 ha) in size, and where the total of all spots treated does not exceed five per cent of the total field.

***Stale seedbed*** — seedbed prepared for planting, with subsequent weed growth controlled with a herbicide, thereby allowing the crop to be seeded with minimal soil disturbance.

***Surfactant*** — wetting agent.

***Susceptible*** — crop that may be damaged, or a weed that may be controlled readily by a recommended rate of herbicide.

***Tank mix*** — two chemicals that are purchased separately and mixed in the sprayer tank - as opposed to a mixture formulated by the manufacturer.

***Tolerance*** — ability of a plant to withstand the herbicidal effects of a chemical so that the plant's growth and development are not adversely affected.

***Translocated herbicide (systemic)*** — herbicide that moves within the plant.

***Water dispersible granule*** — granular formulation designed to be dispersed in water for application as a spray.

***Weed control*** — process of limiting weed infestations so that crops can be grown profitably or other operations can be conducted efficiently.

***Wettable powder*** — powder that will readily form a suspension in water. Suspensions require agitation to prevent settling of the solid particles.

# The Metric System

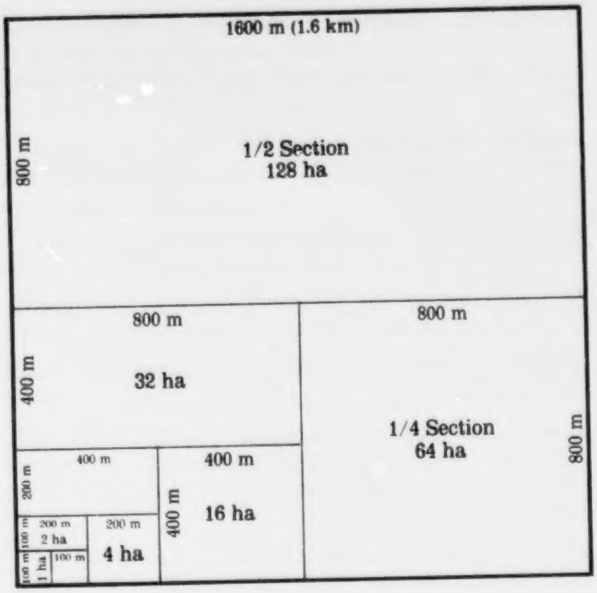
The Pest Control Products Act of Canada requires herbicide labels to be in metric units. Since labels are metric, use of metric units can help prevent confusion.

## Acres to Hectares

Acres can be converted to hectares by dividing acres by 2.5, or by using the following chart.

To use the chart, go down the acre range column to the correct range and then across to the exact acre figure. For example, if field size is 49.0 acres, go down to the 40 - 49 range and across to the 9 column. The answer is 19.6 hectares. This can be rounded to 20 hectares.

For field sizes over 100 acres, start with 40 hectares for each 100 acres and use the chart for the remaining acres. For example, if field size is 149.0 acres, start with 40 hectares and add 19.6 from the chart to get a final answer of 59.6 or 60 hectares.



| Acre Range | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 - 9 | 0 | 0.4 | 0.8 | 1.2 | 1.6 | 2.0 | 2.4 | 2.8 | 3.2 | 3.6 |
| 10 - 19 | 4.0 | 4.4 | 4.8 | 5.2 | 5.6 | 6.0 | 6.4 | 6.8 | 7.2 | 7.6 |
| 20 - 29 | 8.0 | 8.4 | 8.8 | 9.2 | 9.6 | 10.0 | 10.4 | 10.8 | 11.2 | 11.6 |
| 30 - 39 | 12.0 | 12.4 | 12.8 | 13.2 | 13.6 | 14.0 | 14.4 | 14.8 | 15.2 | 15.6 |
| 40 - 49 | 16.0 | 16.4 | 16.8 | 17.2 | 17.6 | 18.0 | 18.4 | 18.8 | 19.2 | 19.6 |
| 50 - 59 | 20.0 | 20.4 | 20.8 | 21.2 | 21.6 | 22.0 | 22.4 | 22.8 | 23.2 | 23.6 |
| 60 - 69 | 24.0 | 24.4 | 24.8 | 25.2 | 25.6 | 26.0 | 26.4 | 26.8 | 27.2 | 27.6 |
| 70 - 79 | 28.0 | 28.4 | 28.8 | 29.2 | 29.6 | 30.0 | 30.4 | 30.8 | 31.2 | 31.6 |
| 80 - 89 | 32.0 | 32.4 | 32.8 | 33.2 | 33.6 | 34.0 | 34.4 | 34.8 | 35.2 | 35.6 |
| 90 - 99 | 36.0 | 36.4 | 36.8 | 37.2 | 37.6 | 38.0 | 38.4 | 38.8 | 39.2 | 39.6 |

1 acre = 0.4 hectare

1 hectare = 2.5 acres

1 ha = 10 000 m$^2$

## Metric Conversion Factors

### Symbols

*Length*

mm - millimetre
cm - centimetre
m - metre
km - kilometre

*Area*

m$^2$ - square metre
ha - hectare

*Weight*

mg - milligram
g - gram
kg - kilogram
t - tonne

*Volume*

mL - millilitre
L - litre
m$^3$ - cubic metre

*Pressure*

kPa - kilopascal

*Temperature*

°C - degree Celsius

### Relationships

*Length*

10 mm = 1 cm
100 cm = 1 m
1000 m = 1 km

*Area*

10 000 m$^2$ = 1 ha

*Weight*

1000 mg = 1g
1000 g = 1 kg
1000 kg = 1 t

*Volume*

1000 mL = 1 L
1000 L = 1 m$^3$

*Length*

1 in = 2.54 cm
1 ft = 0.3048 m
1 yd = 0.914 m
1 mile = 1.609 km
1 m = 1.09 yd
1 m = 3.28 ft

*Area*

1 sq in = 6.452 cm$^2$
1 sq ft = 0.093 m$^2$
1 sq yd = 0.836 m$^2$
1 acre = 0.4047 ha
1 sq mile = 256 ha
1 ha = 2.47A
1 m$^2$ = 10.8 ft$^2$
1 m$^2$ = 1.2 yd$^2$

*Weight*

1 oz = 28.35 g
1 lb = 0.4536 kg
1 ton = 0.907 t
1 kg = 2.20 lbs

*Volume*

1 fl oz = 28.41 mL
1 fl oz (US) = 29.57 mL
1 pint = 0.568 L
1 quart = 1.137 L
1 gal = 4.546 L
1 US gal = 3.785 L
1 cu in = 16.387 cm$^3$
1 cu ft = 0.028 m$^3$
1 cu yd = 0.765 m$^3$
1L = 0.88 qt
1L = 0.22 gal
1 m$^3$ = 35.71 ft$^3$
1 m$^3$ = 1.31 yd$^3$

*Proportion*

1 fl oz/acre = 70.21 mL/ha
1 oz/acre = 70.06 g/ha
1 lb per acre = 1.121 kg/ha
1 lb/in$^2$ (psi) = 6.895 kPa
1 pint/acre = 1.40 L/ha
1 qt/acre = 2.81 L/ha
1 gal/acre = 11.23 L/ha
1 kg/ha = 0.89 lb/A
1 L/ha = .089 gal/acre

*Temperature*

°C = 5/9(°F - 32)
°F = 9/5°C + 32

**NOTE:** *The Manitoba Agriculture factsheet Metric Units for Herbicide Use contains additional information.*

## Approximate Conversions

| ***acres*** | ***hectares*** |
|---|---|
| 1 | 0.4 |
| 2.5 | 1 |
| 5 | 2 |
| 10 | 4 |
| 15 | 6 |
| 20 | 8 |
| 25 | 10 |
| 30 | 12 |
| 40 | 16 |
| 50 | 20 |
| 60 | 24 |
| 75 | 30 |

| ***gallons*** | ***litres*** |
|---|---|
| 100 | 450 |
| 110 | 500 |
| 150 | 700 |
| 200 | 900 |
| 220 | 1000 |
| 250 | 1100 |
| 300 | 1400 |
| 330 | 1500 |
| 350 | 1600 |
| 400 | 1800 |
| 440 | 2000 |
| 500 | 2300 |

| *gallons per acre* | *litres per acre* | *litres per hectare* |
|---|---|---|
| 4 | 18 | 45 |
| 4.5 | 20 | 50 |
| 5 | 22 | 55 |
| 9 | 40 | 100 |
| 10 | 45 | 110 |
| 13.5 | 60 | 150 |
| 15 | 70 | 170 |
| 18 | 80 | 200 |
| 20 | 90 | 220 |
| 50 | 220 | 550 |

**NOTE:** *The chart inside the back cover of this Guide provides rate conversions from L or kg/ha to L or kg/acre.*

| ***psi*** | ***kPa*** |
|---|---|
| 15 | 100 |
| 20 | 150 |
| 25 | 175 |
| 30 | 200 |
| 35 | 250 |
| 40 | 275 |
| 45 | 300 |
| 50 | 350 |

| ***U.S. gallons*** | ***litres*** |
|---|---|
| 100 | 380 |
| 200 | 760 |
| 300 | 1140 |
| 400 | 1510 |
| 500 | 1890 |
| 600 | 2270 |

| ***ounces per acre*** | ***grams per acre*** | ***grams per hectare*** |
|---|---|---|
| 1 | 28 | 70 |
| 2 | 61 | 150 |
| 4 | 111 | 275 |
| 6 | 172 | 425 |
| 8 | 223 | 550 |
| 10 | 283 | 700 |
| 12 | 344 | 850 |

| ***pounds per acre*** | ***kilograms per acre*** | ***kilograms per hectare*** |
|---|---|---|
| 0.90 | 0.405 | 1.00 |
| 1.00 | 0.45 | 1.10 |
| 1.25 | 0.61 | 1.50 |
| 1.50 | 0.71 | 1.75 |
| 1.75 | 0.81 | 2.00 |
| 2.00 | 0.91 | 2.25 |
| 2.70 | 1.21 | 3.00 |
| 3.00 | 1.32 | 3.25 |
| 4.00 | 1.82 | 4.50 |
| 4.50 | 2.02 | 5.00 |
| 6.00 | 2.73 | 6.75 |
| 9.00 | 4.05 | 10.00 |
| 10.00 | 4.45 | 11.00 |
| 25.00 | 11.10 | 27.50 |

# Herbicide Application Record

**FOR THE 19 . . . . . . . . SEASON:**

**FIELD DESCRIPTION:** . . . . . . . . . . . . . . . . . . . . . . . **ACRES:** . . . . . . . . . . . . . . . . . . . . . **CROP:** . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**VARIETY:** . . . . . . . . . . . . . . . . . . . . . . . **DATE SEEDED:** . . . . . . . . . . . . . . . . . . . . . **FERTILITY:** . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**CROP STAGE:** . . . . . . . . . . . . . . . . . . . . . **SCOUTING DATE:** . . . . . . . . . . . . . . . . . . . . **DATE RESULTS WERE CHECKED:** . . . . . . . . . . . . . . .

| **WEEDS** | | **DENSITY** | | | | **RESULTS** | **FIELD DIAGRAM** |
|---|---|---|---|---|---|---|---|
| SPECIES | LEAF STAGE | PATCHES | LOW | MEDIUM | HIGH | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
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| | | | | | | | |

**COMMENTS:** ________________________________________________

________________________________________________

________________________________________________

________________________________________________

# Application

**EQUIPMENT USED:** ______________________ **TANK CAPACITY:** ______________________

| APPLICATION INFORMATION | | | | | | | ENVIRONMENT INFORMATION | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| HERBICIDE USED | DATE AND TIME | RATE PER ACRE | WATER VOLUME PER ACRE | ACRES PER TANK | HERBICIDE VOLUME PER TANK | TANKS PER FIELD | CROP STAND | SOIL MOISTURE | TEMP-ERATURE | WIND SPEED AND DIRECTION |
| **1**<br>LOT #:<br>__________ | | | | | | | Ex. .......<br>G. .......<br>Fr. .......<br>Pr. ....... | Ex. .......<br>G. .......<br>Fr. .......<br>Pr. ....... | | |
| COMMENTS:<br>(eg. incorporation details if needed) | | | | | | | | | | |
| **2**<br>LOT #:<br>__________ | | | | | | | Ex. .......<br>G. .......<br>Fr. .......<br>Pr. ....... | Ex. .......<br>G. .......<br>Fr. .......<br>Pr. ....... | | |
| COMMENTS:<br>(eg. incorporation details if needed) | | | | | | | | | | |
| **3**<br>LOT #:<br>__________ | | | | | | | Ex. .......<br>G. .......<br>Fr. .......<br>Pr. ....... | Ex. .......<br>G. .......<br>Fr. .......<br>Pr. ....... | | |
| COMMENTS:<br>(eg. incorporation details if needed) | | | | | | | | | | |

**NOTE:** Ex. = Excellent G. = Good Fr. = Fair Pr. = Poor

# Herbicide Application Record

**FOR THE 19 . . . . . . . . SEASON:**

**FIELD DESCRIPTION:** . . . . . . . . . . . . . . . . . . . . . **ACRES:** . . . . . . . . . . . . . . . . . . . . . **CROP:** . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**VARIETY:** . . . . . . . . . . . . . . . . . . . . . . . **DATE SEEDED:** . . . . . . . . . . . . . . . . . . . . . **FERTILITY:** . . . . . . . . . . . . . . . . . . . . . . . . . .

**CROP STAGE:** . . . . . . . . . . . . . . . . . . . . . **SCOUTING DATE:** . . . . . . . . . . . . . . . . . . . . . **DATE RESULTS WERE CHECKED:** . . . . . . . . . . . . . .

| WEEDS | | DENSITY | | | | RESULTS | FIELD DIAGRAM |
|---|---|---|---|---|---|---|---|
| SPECIES | LEAF STAGE | PATCHES | LOW | MEDIUM | HIGH | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
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| | | | | | | | |

**COMMENTS:** ____________________________________________

# Application

**EQUIPMENT USED:** ______________________ **TANK CAPACITY:** ______________________

| APPLICATION INFORMATION | | | | | | | ENVIRONMENT INFORMATION | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| HERBICIDE USED | DATE AND TIME | RATE PER ACRE | WATER VOLUME PER ACRE | ACRES PER TANK | HERBICIDE VOLUME PER TANK | TANKS PER FIELD | CROP STAND | SOIL MOISTURE | TEMP-ERATURE | WIND SPEED AND DIRECTION |
| 1<br>LOT #:<br>____________ | | | | | | | Ex. .......<br>G. .......<br>Fr. .......<br>Pr. ....... | Ex. .......<br>G. .......<br>Fr. .......<br>Pr. ....... | | |
| COMMENTS:<br>(eg. incorporation details if needed) | | | | | | | | | | |
| 2<br>LOT #:<br>____________ | | | | | | | Ex. .......<br>G. .......<br>Fr. .......<br>Pr. ....... | Ex. .......<br>G. .......<br>Fr. .......<br>Pr. ....... | | |
| COMMENTS:<br>(eg. incorporation details if needed) | | | | | | | | | | |
| 3<br>LOT #:<br>____________ | | | | | | | Ex. .......<br>G. .......<br>Fr. .......<br>Pr. ....... | Ex. .......<br>G. .......<br>Fr. .......<br>Pr. ....... | | |
| COMMENTS:<br>(eg. incorporation details if needed) | | | | | | | | | | |

**NOTE:** Ex. = Excellent G. = Good Fr. = Fair Pr. = Poor

FOR THE 19 . . . . . . . . SEASON:

# *Herbicide Application Record*

**FIELD DESCRIPTION:** . . . . . . . . . . . . . . . . . . . . . . **ACRES:** . . . . . . . . . . . . . . . . . . . . . **CROP:** . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**VARIETY:** . . . . . . . . . . . . . . . . . . . . . . . . **DATE SEEDED:** . . . . . . . . . . . . . . . . . . . . . **FERTILITY:** . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**CROP STAGE:** . . . . . . . . . . . . . . . . . . . . . **SCOUTING DATE:** . . . . . . . . . . . . . . . . . . . . . **DATE RESULTS WERE CHECKED:** . . . . . . . . . . . . . . .

| WEEDS | | DENSITY | | | | RESULTS | FIELD DIAGRAM |
|---|---|---|---|---|---|---|---|
| SPECIES | LEAF STAGE | PATCHES | LOW | MEDIUM | HIGH | | |
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**COMMENTS:** ____________________________________________

# Application

EQUIPMENT USED: ______________________ TANK CAPACITY: ______________________

| APPLICATION INFORMATION | | | | | | | ENVIRONMENT INFORMATION | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| HERBICIDE USED | DATE AND TIME | RATE PER ACRE | WATER VOLUME PER ACRE | ACRES PER TANK | HERBICIDE VOLUME PER TANK | TANKS PER FIELD | CROP STAND | SOIL MOISTURE | TEMP-ERATURE | WIND SPEED AND DIRECTION |
| **1**<br>LOT #:<br>__________ | | | | | | | Ex. .......<br>G. .......<br>Fr. .......<br>Pr. ....... | Ex. .......<br>G. .......<br>Fr. .......<br>Pr. ....... | | |
| COMMENTS:<br>(eg. incorporation details if needed) | | | | | | | | | | |
| **2**<br>LOT #:<br>__________ | | | | | | | Ex. .......<br>G. .......<br>Fr. .......<br>Pr. ....... | Ex. .......<br>G. .......<br>Fr. .......<br>Pr. ....... | | |
| COMMENTS:<br>(eg. incorporation details if needed) | | | | | | | | | | |
| **3**<br>LOT #:<br>__________ | | | | | | | Ex. .......<br>G. .......<br>Fr. .......<br>Pr. ....... | Ex. .......<br>G. .......<br>Fr. .......<br>Pr. ....... | | |
| COMMENTS:<br>(eg. incorporation details if needed) | | | | | | | | | | |

**NOTE:** Ex. = Excellent G. = Good Fr. = Fair Pr. = Poor

# *Herbicide Application Record*

**FOR THE 19 . . . . . . . . SEASON:**

**FIELD DESCRIPTION:** . . . . . . . . . . . . . . . . . . . . . . . . **ACRES:** . . . . . . . . . . . . . . . . . . . . . **CROP:** . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**VARIETY:** . . . . . . . . . . . . . . . . . . . . . . . . **DATE SEEDED:** . . . . . . . . . . . . . . . . . . . . . **FERTILITY:** . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**CROP STAGE:** . . . . . . . . . . . . . . . . . . . . . . **SCOUTING DATE:** . . . . . . . . . . . . . . . . . . . . . **DATE RESULTS WERE CHECKED:** . . . . . . . . . . . . . . . . .

| WEEDS | | DENSITY | | | | RESULTS | FIELD DIAGRAM |
|---|---|---|---|---|---|---|---|
| SPECIES | LEAF STAGE | PATCHES | LOW | MEDIUM | HIGH | | |
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**COMMENTS:**

# *Application*

**EQUIPMENT USED:** ______________________ **TANK CAPACITY:** ______________________

| APPLICATION INFORMATION | | | | | | | ENVIRONMENT INFORMATION | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| HERBICIDE USED | DATE AND TIME | RATE PER ACRE | WATER VOLUME PER ACRE | ACRES PER TANK | HERBICIDE VOLUME PER TANK | TANKS PER FIELD | CROP STAND | SOIL MOISTURE | TEMP-ERATURE | WIND SPEED AND DIRECTION |
| **1**<br>LOT #:<br>____________ | | | | | | | Ex. .......<br>G. .......<br>Fr. .......<br>Pr. ....... | Ex. .......<br>G. .......<br>Fr. .......<br>Pr. ....... | | |
| COMMENTS:<br>(eg. incorporation details if needed) | | | | | | | | | | |
| **2**<br>LOT #:<br>____________ | | | | | | | Ex. .......<br>G. .......<br>Fr. .......<br>Pr. ....... | Ex. .......<br>G. .......<br>Fr. .......<br>Pr. ....... | | |
| COMMENTS:<br>(eg. incorporation details if needed) | | | | | | | | | | |
| **3**<br>LOT #:<br>____________ | | | | | | | Ex. .......<br>G. .......<br>Fr. .......<br>Pr. ....... | Ex. .......<br>G. .......<br>Fr. .......<br>Pr. ....... | | |
| COMMENTS:<br>(eg. incorporation details if needed) | | | | | | | | | | |

**NOTE:** Ex. = Excellent G. = Good Fr. = Fair Pr. = Poor

# *Herbicide Application Record*

**FOR THE 19 . . . . . . . . SEASON:**

**FIELD DESCRIPTION:** . . . . . . . . . . . . . . . . . . . . . . **ACRES:** . . . . . . . . . . . . . . . . . . . . **CROP:** . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**VARIETY:** . . . . . . . . . . . . . . . . . . . . . . . . **DATE SEEDED:** . . . . . . . . . . . . . . . . . . . . . **FERTILITY:** . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

**CROP STAGE:** . . . . . . . . . . . . . . . . . . . . . . **SCOUTING DATE:** . . . . . . . . . . . . . . . . . . . . . . **DATE RESULTS WERE CHECKED:** . . . . . . . . . . . . . . . .

| WEEDS | | DENSITY | | | | RESULTS | FIELD DIAGRAM |
|---|---|---|---|---|---|---|---|
| SPECIES | LEAF STAGE | PATCHES | LOW | MEDIUM | HIGH | | |
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**COMMENTS:** ______________________________________________

# *Application*

EQUIPMENT USED: ______________________ TANK CAPACITY: ______________________

| APPLICATION INFORMATION | | | | | | | ENVIRONMENT INFORMATION | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| HERBICIDE USED | DATE AND TIME | RATE PER ACRE | WATER VOLUME PER ACRE | ACRES PER TANK | HERBICIDE VOLUME PER TANK | TANKS PER FIELD | CROP STAND | SOIL MOISTURE | TEMP-ERATURE | WIND SPEED AND DIRECTION |
| 1<br>LOT #:<br>__________ | | | | | | | Ex. .......<br>G. .......<br>Fr. .......<br>Pr. ....... | Ex. .......<br>G. .......<br>Fr. .......<br>Pr. ....... | | |
| COMMENTS:<br>(eg. incorporation details if needed) | | | | | | | | | | |
| 2<br>LOT #:<br>__________ | | | | | | | Ex. .......<br>G. .......<br>Fr. .......<br>Pr. ....... | Ex. .......<br>G. .......<br>Fr. .......<br>Pr. ....... | | |
| COMMENTS:<br>(eg. incorporation details if needed) | | | | | | | | | | |
| 3<br>LOT #:<br>__________ | | | | | | | Ex. .......<br>G. .......<br>Fr. .......<br>Pr. ....... | Ex. .......<br>G. .......<br>Fr. .......<br>Pr. ....... | | |
| COMMENTS:<br>(eg. incorporation details if needed) | | | | | | | | | | |

**NOTE:** Ex. = Excellent G. = Good Fr. = Fair Pr. = Poor